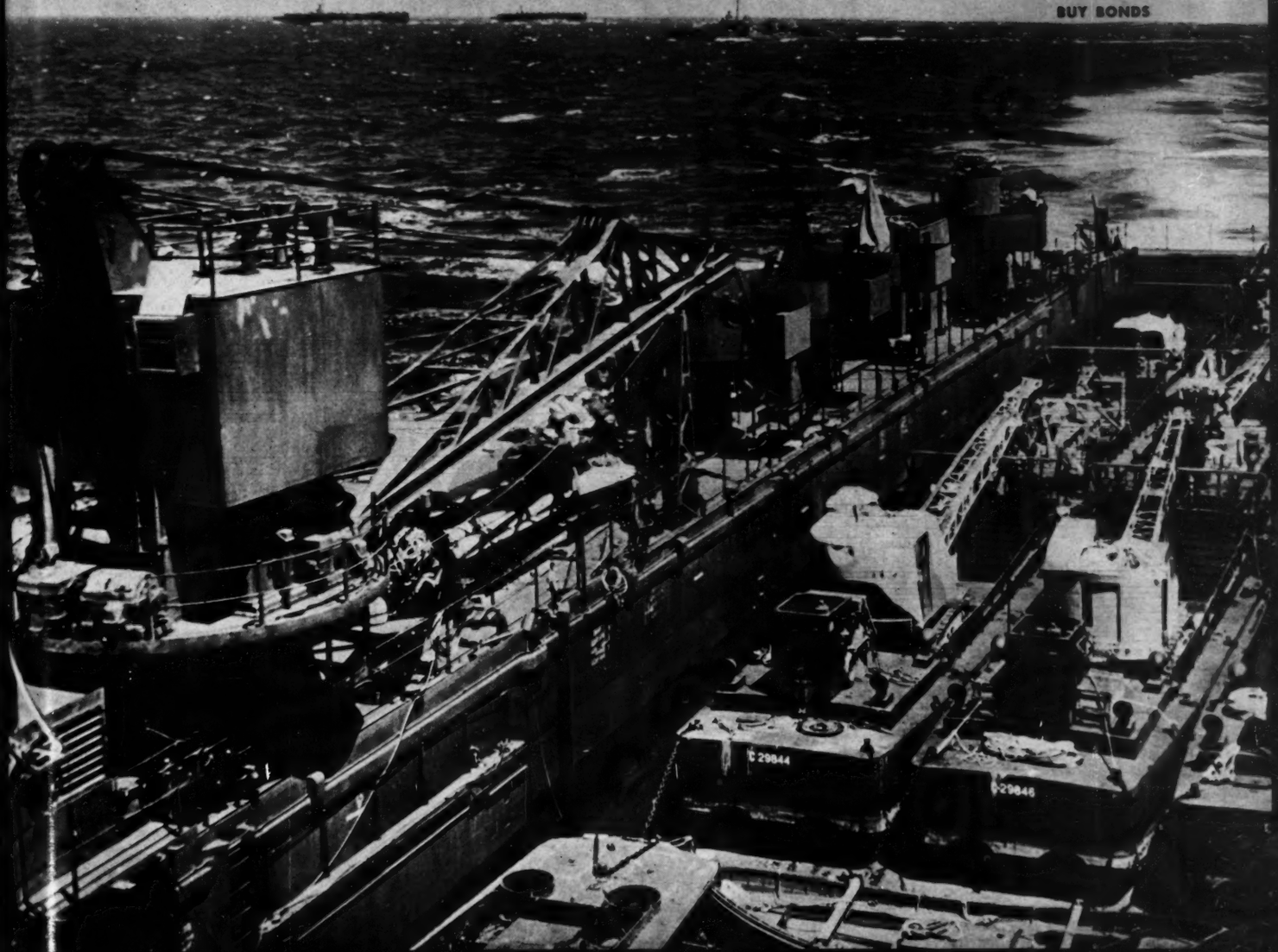
NOLOGY DEPT

Construction Methods

NOV 19 1945
DETROIT

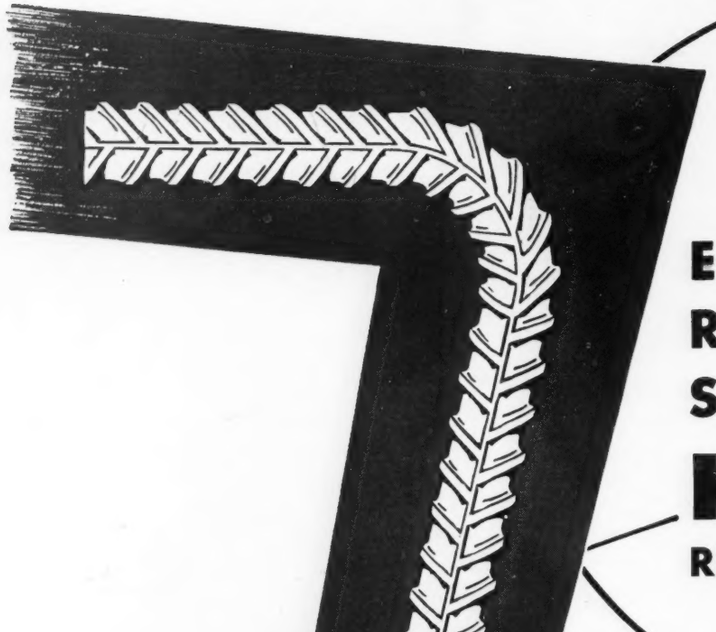
NOVEMBER 1945

VICTORY LOAN
BUY BONDS



TWO-STAGE TRANSPORT of construction machines, riding LCM's on floor of LSD, suggests new ways to put equipment ashore for post-war work.

Industry's Responsibility Toward War Veterans – by Major Laurie C. Green • Access Road Opens New Quinine Source
Pressure Welding Fuses Joints of 24-In. Steel Pipeline • Sliding Forms Build Concrete Tanks
Air-Entrained Concrete Refaces Dam – by H. A. Moody • Machine Shop Operates During Reconstruction
Small Crew Razes Mississippi River Bridge



seven important

ENGINEERING REASONS FOR SPECIFYING HI-BOND REINFORCING BARS

1. Higher Bonding Strength.
HI-BOND bars provide a substantial increase in bond value as compared with present day reinforcing bars.

2. Greater Mechanical Grip.
HI-BOND bars provide a more effective mechanical grip with the concrete irrespective of the position in which they are cast or the direction in which they are pulled.

3. Higher Stress Transfer.
HI-BOND bars provide a more efficient transfer of stress at splices and reduce the need for hook anchorage.

4. Better Crack Control.
HI-BOND bars materially reduce the width of cracks, thereby reducing the possibility of corrosion of the steel at cracks and preserving the appearance and safety of reinforced concrete members.

5. Greater Resistance To Slip.
HI-BOND bars through superior resistance to slip reduce deflections of beams and deformations of columns.

6. Higher Design Stresses Possible.
HI-BOND bars will contribute to the effective use of high yield strength reinforcing steel and the further development of pre-stressed construction.

7. Lower Construction Costs.
HI-BOND bars in reinforced concrete will result in more efficient structures and in addition lower construction costs through conservation of materials and labor.

Write for bulletin "Engineering Tests Prove Bonding Strength of HI-BOND Reinforcing Bar."

Bars, Floor Plate, Piling, Plates, Rails, Reinforcing Bars, Sheets, Strip, Structurals, Tin Plate, Track Accessories.

INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois

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INLAND HI-BOND
CONCRETE REINFORCING BARS

CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Navy contract for $4,848,000 administration building at White Oak, Md., was awarded to **Chas. H. Tompkins Co.**, of Washington, D. C. Low bid of $2,600,000 was received from **A. Janin & Co., Ltd.**, of Montreal, Que. for hospital. **Algernon Blair** of Montgomery, Ala., submitted low bid of $1,817,000 on housing at Camp Le Jeune, N. C.

Industrial—Plant ovens at Lorain, Ohio, will be built by **Wilputte Coke Oven Corp.**, of New York, for estimated $30,000,000. **Stone & Webster Engineering Corp.**, of New York, has $9,000,000 contract for plant at Venice, Ill. Plant at Coshocton, Ohio, will be built by **The Austin Co.** of Cleveland, for $4,706,205. **Wigton Abbott Corp.**, of Plainfield, N. J., will construct $4,500,000 plant at Fort Wayne, Ind. Contract for $3,000,000 plant at Carthage, Tex., went to **Stearns-Rogers Construction Co.**, of Houston. Factory at Elyria, Ohio, will be built by **The Austin Co.**, of Cleveland, for $3,000,000. **Morrison-Knudsen Co., Inc.**, of Boise, Ida., has $2,500,000 contract for plant at Hagerman. **B. W. Construction Co.** of Chicago, will build $2,000,000 factory at Kankakee, Ill. Laboratory at Richmond, Calif., will be erected by **Parker, Steffens & Pearce**, of San Francisco, for $2,000,000. Research plant at Whiting, Ind., will be built by **Jos. T. Ryerson & Son, Inc.**, of Chicago, Ill., for $2,000,000. **Turner Construction Co.**, of New York, will build $2,000,000 brewery at Brooklyn. Plant at Trenton, N. J., will be built by **The Austin Co.**, of New York, for $1,600,000. **James Stewart Corp.**, of Chicago, Ill., has $1,180,000 contract for grain elevator at Superior, Wis. **C. T. Wilson Contracting Co.**, of St. Louis, Mo., will build plant at Alton and Woodriver, Ill., for $1,100,000. Contract for $1,017,000 warehouse at St. Louis, Mo., went to **American Bridge Co.**, of Chicago, Ill.

Commercial—Department store at Pasadena Calif., will be built by **P. J. Walker Co.**, of Los Angeles, for $3,000,000. **American Construction Co.**, of Houston, Tex., has $1,750,000 contract for office building. **C. L. Peck**, of Los Angeles, Calif., will build $1,500,000 department store. **M. K. Stevens**, of Philadelphia, Pa., has $1,000,000 contract for apartment. Contract was awarded to **Irons & Reynolds**, of New York, for $1,000,000 museum.

HEAVY CONSTRUCTION

Low bid of $3,361,088 for Navy pipeline at San Diego, Calif., was received from **United Concrete Pipe Corp., of Los Angeles.** Pipeline in Kansas will be built for $2,419,200 by **Oklahoma Contracting Co.**, of Dallas, Tex., which will also build pipeline in Texas for $2,091,000. Another Texas pipeline section will be built by **J. R. Horrigan Construction Co.**, of Houston, for $2,030,000. Atlantic City, N. J., race track will be built by **Matthew H. McCloskey**, of Philadelphia, Pa., for $1,600,000.

HIGHWAYS

Among recent highway contract awards are the following: California: $637,799 to **N. M. Ball Sons, of Berkeley.** Connecticut: $373,493 to **Lane Construction Co.**, of Meriden; and $611,940 to **D. V. Frione & Co.**, of New Haven. Delaware: $236,576 to **George & Lynch**, of Wilmington. Illinois: $570,000 to **I. D. Lain Co.**, of Springfield. New Jersey: $528,742 and $240,052 to **Franklin Contracting Co.**, of Newark. New York: $967,736 to **Peter Mitchell, Inc.**, of Greenwich, Conn.; and $1,436,363 to **A. I. Savin Construction Co.**, of East Hartford, Conn. Texas: $561,537 to **Spencer Construction Co.** and **Towles Construction Co.** of Carrollton. Virginia: $546,604 to **Nello L. Teer Co.**, of Durham, N. C.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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ROBERT K. TOMLIN, Editor

Editorial Staff: Vincent B. Smith; Donald D. King; Nelle Fitzgerald; Patricia McGerr; Donald D. Hogate and A. N. Carter (Washington) N. A. Bowers (San Francisco)

NOVEMBER, 1945

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **CONSTRUCTION EQUIPMENT** was transported on low-bed semi-trailer —p. 79

How **AMPHIBIOUS OPERATIONS** in Pacific developed new techniques for transporting construction equipment and supplies —p. 82

How **MACHINE SHOP** was rebuilt without delaying ship repairs —p. 86

How **ACCESS ROAD** was constructed over difficult terrain in Costa Rica —p. 88

How **PRESSURE WELDING** expedited work on 1,265-mi. pipeline —p. 90

How **SLIDING FORMS** permitted continuous concreting of cylindrical bins —p. 94

How **INTERLOCKING JOINTS** were used in walls of sawed coral —p. 95

How **MUCKING MACHINE** was used for tunnel excavation —p. 98

How **NEW BLANKET** of air-entrained concrete repaired disintegrated face of dam —p. 100

How **TRACTOR-MOUNTED EQUIPMENT** facilitated placing of telegraph poles —p. 102

How **OKINAWA** was converted into extensive airbase by Army Engineers and Seabees —p. 104

How **SECONDARY ROADS** are maintained by state highway department —p. 106

How **NINE-SPAN BRIDGE** was razed by small demolition crew —p. 108

How **FUNCTIONAL DESIGN** is featured in "service station of tomorrow" —p. 110

How **GIANT ROLLERS** compacted airfield subgrades for heavy plane loads —p. 111

How **SUSPENDED SCAFFOLD** was used in redecoration of Grand Central ceiling —p. 112

How **CONCRETE WORK** on Anderson Ranch Dam was rushed to completion —p. 116

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MORE POWER — 75 Diesel brake h.p. . . . more than any other motor grader.

MORE TRACTION — 21,500 lbs. weight . . . higher percentage of weight on tandem wheels than any other motor grader.

MORE CLEARANCE — Extra clearance under front axle and circle.

FULL RANGE OF BLADE POSITIONS — Easier, more accurately handles straight grading, high bank cuts, hard ditch cuts, heavy oil mixing.

*SOME OF THE NEW BONUS FEATURES

NEW-TYPE CLUTCH — larger capacity, longer life, easier to operate.

NEW GEAR SHIFT MECHANISM — easier operation, better service.

ELECTRIC BRAKES — first time on road graders. No adjustment, no high pressure tubing, no vapor-locks — far easier to operate.

IMPROVED TRANSMISSION — gears automatically locked in place — no jumping out of mesh.

EASIER CONTROL — leverage redesigned in control box to give approximately 30 per cent easier operation.

ELECTRIC INSTRUMENTS — eliminate all tubing on machine except fuel lines.

IMPROVED STEERING — leaning front wheels easier to operate.

IN ALL — SOME 35 IMPROVEMENTS HAVE BEEN MADE!

GYOUR WAY. . .

MODEL A-D MOTOR GRADER

NOW BACK IN PRODUCTION . . .
A BETTER MACHINE THAN EVER!

Soon the Model A-D Motor Grader, with its many distinct advantages, can be *yours!*

Again in production after making way for the manufacture of war goods . . . the A-D brings you all its former outstanding features, plus some 35 improvements.* Operation is further simplified, made easier . . . there is extra overall strength . . . life of clutches, brakes, and other parts is lengthened.

Look for this better-than-ever motor grader — it's coming your way! The demand is big . . . there are many orders to fill . . . so get your name on your Allis-Chalmers dealer's list . . . NOW!

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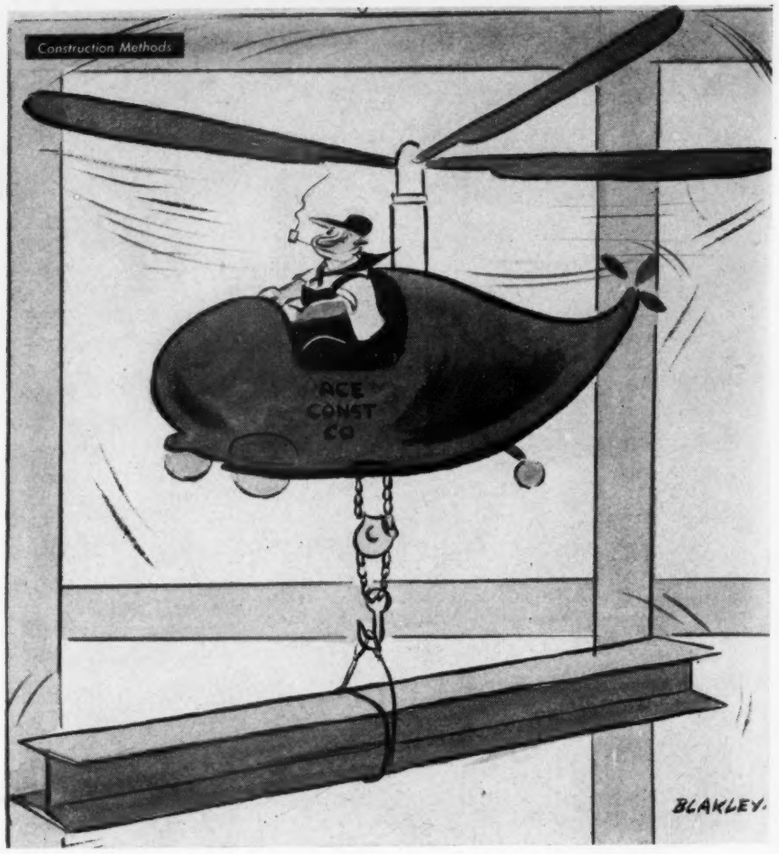
YOU GET ALL THREE WITH THE MODEL A-D . . .
★POWER ★TRACTION ★CLEARANCE

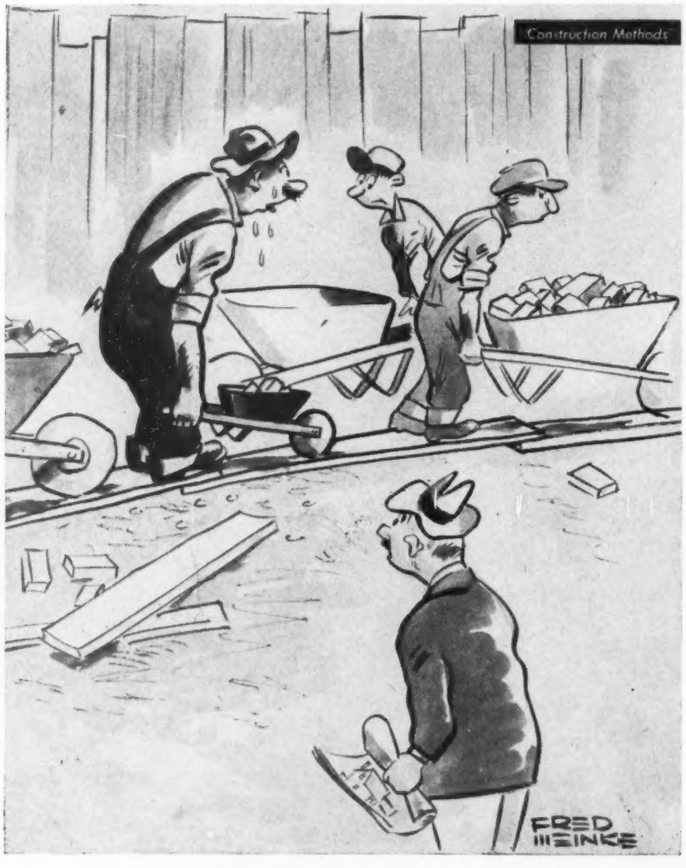
A 90° BANK-CUTTING ANGLE MAKES STEEPEST BANKS EASY TO SLOPE.

LEANING FRONT WHEELS MAKE HEAVY DITCH CUTS EASIER TO HANDLE.

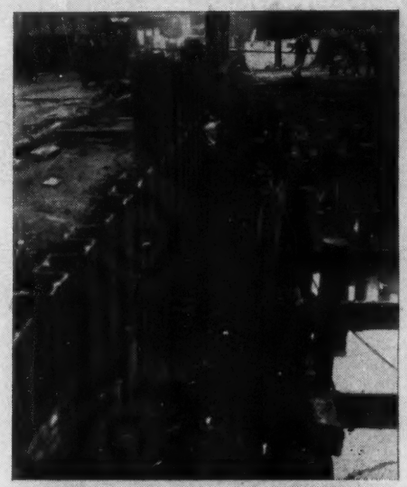
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS





"Just putting a pail under the leak will be enough, Swanson. You don't need to dramatize everything."



New bulkhead of Z-type interlocking steel sheetpiling, driven 2½ ft. behind old timber sheeting, retains fill in this New York shipyard. Contractor, George W. Rogers Construction Corp., New York.

At 15-ft. intervals, 3½ in. steel tie-rods, 19 and 21 ft. long, threaded at ends for sleeve couplings, were driven horizontally through 100 ft. of cinder fill.

(Right) Nearly completed bulkhead with protruding end of tie-rod, ready to install pair of wide steel-beam wales at elevation of tie-rods.

A HANDFUL OF 'INCOR' DID THE TRICK

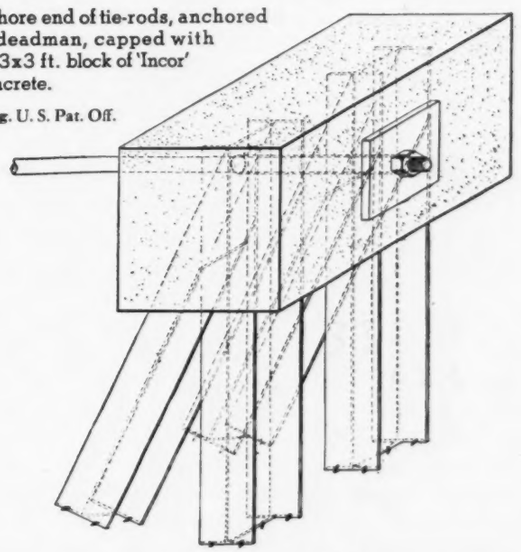
'INCOR' CONCRETE CAPS HOLD TIE-RODS DRIVEN HORIZONTALLY THROUGH 100' OF SHIPWAY FILL

SCORE another win for construction know-how, with an assist for 'Incor' 24-Hour Cement. Old bulkhead, retaining cinder fill, in one of the Port of New York's principal shipyards, had to be replaced while ship construction proceeded on adjacent shipway.

George W. Rogers Construction Co., New York, drove sheetpiling inside old timber sheeting . . . tied the new facing to deadmen located 100 ft. back from bulkhead, by driving heavy steel tie-rods horizontally through fill, at a level 2 ft. above mean low water, between tides in 5-ft. tidal range.

Inshore ends of tie-rods were anchored to deadmen capped with 'Incor' concrete. A handful of 'Incor' did the trick, attaining service strength between tides . . . providing strong, dense, durable concrete to resist difficult exposure conditions.

Timely reminder: Dependable 'Incor' early strength speeds winter work, cuts heat-protection costs 50-60%, halves form costs. Use 'Incor'* for quality, speed and economy.



Inshore end of tie-rods, anchored to deadman, capped with 5x3x3 ft. block of 'Incor' concrete.

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

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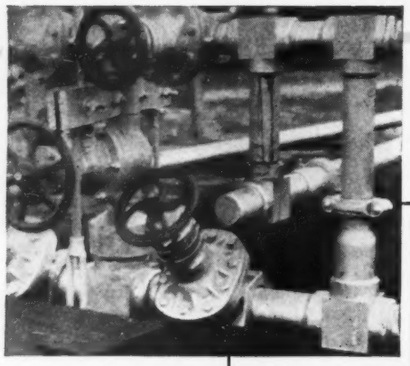
Climax Flexible Lock Coupling ABSORBS VIBRATION

...protects valve and instrument settings. Prevents leaky connections in piping installations!



▪ *Climax Coupling on high pressure line. Compare leak-proof performance of coupling with leaky drop forge fitting at left.*

▪ *Piping and valves in this pump installation are effectively "insulated" from vibration by flexible, leak-proof Climax Couplings. Also, valve may be disassembled from line by removing bolts from* ONLY ONE *flange. Exclusive design features make Climax Couplings 100% satisfactory in service with steam, water, air, gasoline, kerosene, oil or gas up to 1000 lb. working pressure.*

ABSORBING VIBRATION from engines, pumps and compressors is but one of innumerable industrial applications in which Climax Flexible Lock Couplings have proved their superiority.

On high pressure lines—on all piping installations, above and under ground or under water, indoors or outdoors—wherever piping is subject to expansion or contraction from changing temperatures—wherever settling of tanks or vessels or other causes of line deflection may occur—wherever hammering may be set up by rapid opening or closing of valves—the flexibility of this coupling not only absorbs the vibrations and allows for deflection (up to 5 degrees at each coupled point), but also provides a positive permanent *pressure and vacuum tight seal* more enduring than the pipe itself.

With Climax Couplings, costly *threaded pipe and fittings* are eliminated. Connecting-up and disassembly are easy and quick. Money is saved on installations, labor—on material, maintenance and replacement expense.

FOR COMPLETE DETAILS write for Bulletin No. 130. McAlear Manufacturing Co., Automatic Control Division of Climax Industries, 49 N. Cincinnati St., Tulsa, Okla.

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McALEAR

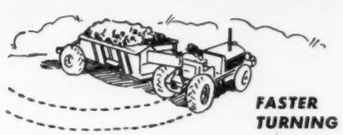
PRESSURE · FLOW · LIQUID LEVEL · TEMPERATURE

controls

for STEAM, WATER, AIR, OIL and GAS

Ease in Handling EUCLIDS Means Lower Cost Operation

BOTTOM-DUMP EUCLID ADVANTAGES



FASTER TURNING

Sturdy, universal hitch and ample clearances for drawbar and doors.

QUICKER DUMPING

Unobstructed full-length-and-width door openings — steep, smooth, quick-shedding hopper sides — and finger-tip, air-operated dumping controls.

TRACTIVE POWER

Distribution of payload, large tires and double reduction planetary drive axle assure good flotation and traction for tough hauls.

On this relocation of a Pennsylvania State Highway between Monaca and Aliquippa, Euclids moved approximately 900,000 cu. yds. of heavy clay and rock on long hauls which averaged 3 miles from shovel to dumping area.

In addition to 8 of their own Bottom-Dumps, S. J. Groves & Sons Co. of Minneapolis used 37 other Bottom-Dumps and 8 Rear-Dump EUCLIDS to haul a large part of the total excavation on this project.

Unusual maneuverability of Bottom-Dump EUCLIDS in the narrow working areas on this job was one of the important advantages of this equipment. Another was the rugged simplicity of the Euclids which enabled them to take this tough job in stride day in and day out.

These and other advantages have earned for Euclids their reputation for lower hauling costs. May we send you the proof?

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

BUSINESS THOROUGHFARE

The steady stream of commercial traffic on Green Street, Worcester, Mass., is served by a Texaco Asphaltic Concrete pavement, laid over old granite block and car tracks.

The right pavement
for every part of town

HOSPITAL STREET

Jacques Avenue, Worcester, whose hospital traffic also is served by a Texaco Asphaltic Concrete pavement, in this case laid over old macadam.

As the city of Worcester, Mass., has discovered, Texaco Asphaltic Concrete paving is an excellent choice for every section of a community.

On heavily-travelled business thoroughfare or a quiet avenue alongside a hospital, Texaco Asphaltic Concrete is equally at home. It has a resilience and ruggedness that withstand hard usage for years with a minimum of upkeep. In addition, its pleasing color and texture blend harmoniously with the most attractive environment.

Use Texaco Asphaltic Concrete as a base as well as a wearing surface for streets, highways and airports. The same plant and equipment are used for both base and surface. No curing period is necessary. Base and top course become as one, insuring years of service under the most severe traffic conditions.

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Texaco Engineers, who are Asphalt specialists, will be glad to discuss your paving problem with you and suggest the best and most economical solution. Write our nearest office.

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REG. T. M.

TEXACO ASPHALT

In war or peace
B.F.Goodrich
FIRST IN RUBBER

New construction principle gives tires greater bruise resistance, longer life

USERS of big, costly off-the-road tires often had serious tire trouble. Every time one of the tires hit a rock, rut, or stump (and those damaging obstructions can't always be avoided), the tire took a walloping blow under ton-loads — shocks that frequently caused bruises, ply separation, and blow-outs. Delays and repairs were costly; perhaps the tire was beyond repair — an even heavier loss.

Then B.F.Goodrich developed a tire *shock shield.* This shield is a set of *four* breakers — layers of rubber-coated rayon cords — between the tread and the plies. The breakers are in *pairs,* with the cords in each pair running parallel to each other — but with each pair running in opposite directions to give balanced strength. The breakers are cushioned with thick layers of special shock-resistant rubber.

Under impact, the cords in the breakers stretch together, *not* across each other, and return to their original position. The blow is *distributed* and *absorbed* by the rubber cushions; the shock passed on to the cord body is greatly reduced.

This new shock shield helps users of BFG off-the-road tires get far greater service. Users report fewer bruises, far less ply separation, longer wear. One operator reports 17,226 miles from B. F. Goodrich tires compared to 12,501 for the best of three ordinary tires used; another—15,507 miles compared to 11,304 for the best ordinary tire.

The picture above shows the B. F. Goodrich "Super Traction" tire, especially engineered for traction and flotation. Wide space between cleats gives a big bite for heavy pulling and big yardage without slipping. The tread is self-cleaning too, and the body is flexible but strong.

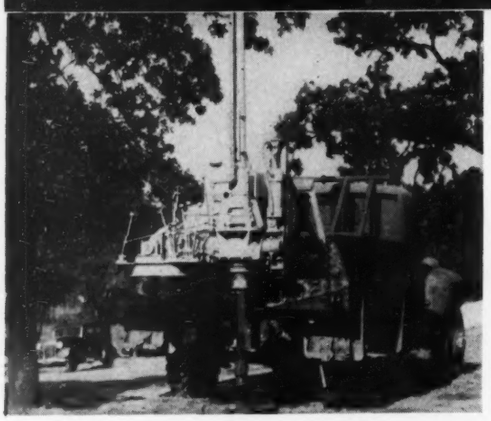
It will pay you to find out more about these better off-the-road tires. Your own records of comparison tests of BFG tires alongside other makes will show you how you can make real savings.

Place tentative orders now — supplies are limited. See the local B.F. Goodrich dealer or write us direct. *The B.F. Goodrich Co., Akron, Ohio.*

Truck Tires BY

B.F. Goodrich

JAQUES EARTH BORING MACHINES



WITH HYDRAULIC CONTROLS

Do the Job

QUICKER • BETTER

Hydraulically controlled to insure ease of operation and provide automatic regulation of cutting speed to suit the texture of the soil, this new, improved JAQUES EARTH BORING MACHINE does the job quicker, better—at a saving both in manpower and cost.

If you have an earth boring job to do, here's the machine to use. Note some of its principal features:

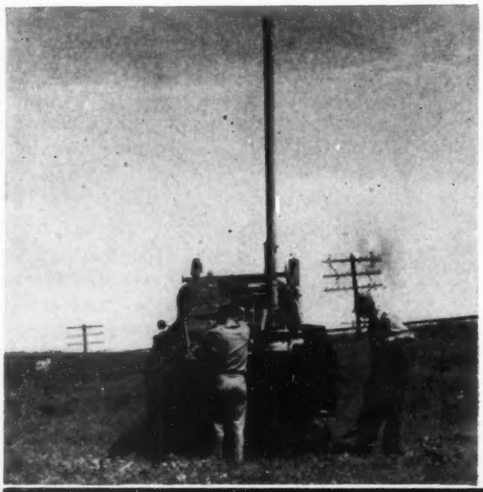
1. EASE OF OPERATION—All hydraulic controls readily accessible to operator. No manual labor required.
2. HYDRAULIC PLUMBING—Controlled by hydraulic power.
3. SPEED—The hydraulic feed automatically regulates the speed of cutting to suit the texture of the soil. Holes are dug faster.
4. SELF-CONTAINED UNIT—When not in use, this machine can easily be removed from truck and stored.
5. POWER—Auxiliary motor of ample capacity—truck motor not used in boring.
6. ANCHOR HOLES—Anchor holes as well as vertical holes may easily be bored.
7. SIZE AND DEPTH OF HOLE—Any size up to twenty-four inch diameter bit may be used and hole may be bored to a depth of eight or nine feet.
8. WEIGHT—3,400 lbs. complete.

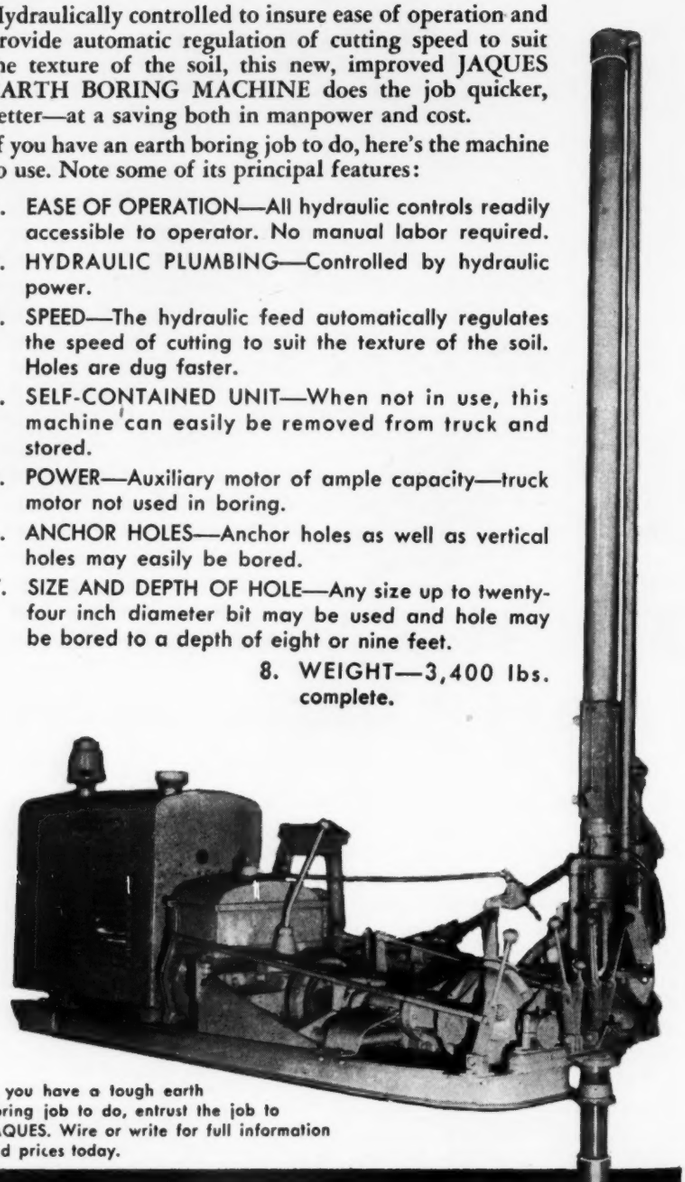
WHAT USERS SAY

"We cannot praise the Jaques Earth Boring Machine too much. We have used three different makes of machines on this job, and in my estimation, it is a whole lot more suitable than a $16,000 machine which was mounted on a caterpillar tractor. We have not found any soil we could not dig except rock. We have even blasted out the rock and finished digging a six-foot hole which we have seen other machines on this project refuse to do."

"We wish to advise you that we are using our Jaques Earth Boring Machine at present and have found it efficient and durable. From all indications, it is as good or better than any other Earth Boring Machine."

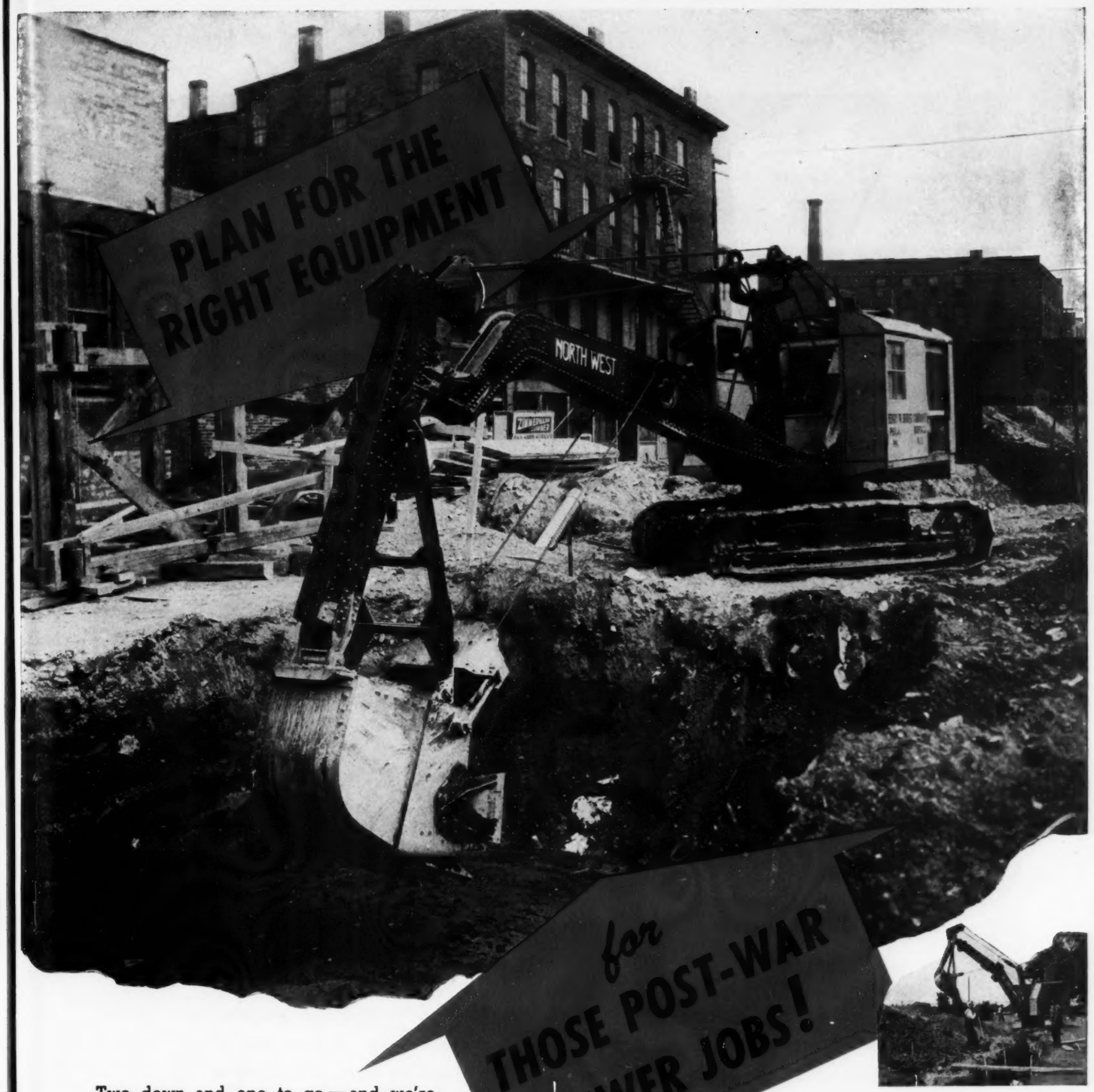
"We have had our machine in operation for four months and have found it entirely satisfactory. This has been used mostly in the construction of rural lines. Our actual hole digging time has averaged 2.5 minutes per hole. We like this machine so much that we have ordered another one."





If you have a tough earth boring job to do, entrust the job to JAQUES. Wire or write for full information and prices today.

JAQUES POWER SAW CO.
Highway 75 Denison, Texas



for
THOSE POST-WAR
SEWER JOBS!

Two down and one to go — and we're getting closer to that postwar building boom that is going to mean 5,000,000 new homes and all the sewers, and water lines and basements they will require.

The Northwest Pullshovel gives you a trenching machine with a versatility equalled by no other type machine for this class of work. It handles any kind of ditch, large, small — dirt or rock. It loads trucks, or spoils to banks. It travels where large, less easily handled machines can't go. It sets pipe or backfills. It digs bell holes or basements. And it can be quickly converted to a Shovel, Crane or Dragline by simply changing booms — it's an all purpose unit that does what no other type trencher can do. Don't put your money in a one-purpose machine.

Plan to have a Northwest Pullshovel on your future sewer work.

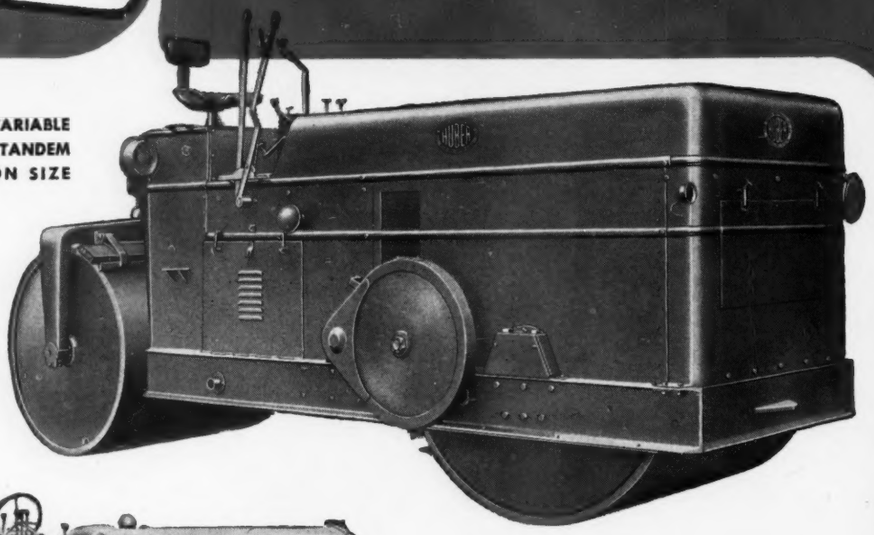
NORTHWEST ENGINEERING CO., 1728 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Ill.

NORTHWEST

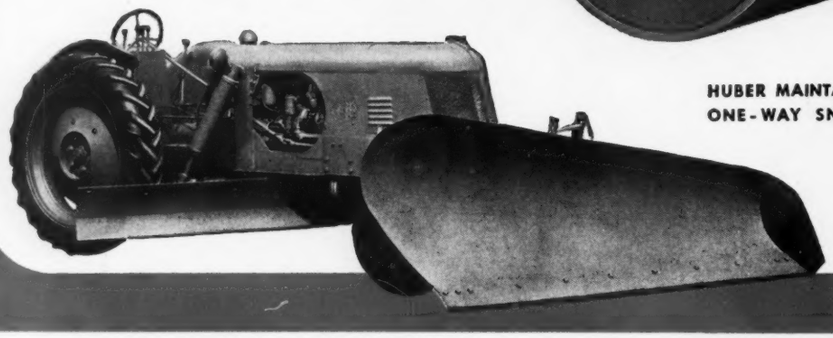
SHOVELS • CRANES • PULLSHOVELS • TRUCK CRANES

Wait until you have seen the new NORTHWEST Rubber Tired Line of Truck Cranes, Truck Shovels or Wagon Cranes Before You Buy!

Here's a Pair You Can't Beat When It Comes to "Road Work"



HUBER VARIABLE WEIGHT TANDEM 8-12 TON SIZE



HUBER MAINTAINER (WITH ONE-WAY SNOW PLOW)

Meet a pair that's "tops" in road work . . . Huber's fast, powerful, highly maneuverable, long-lived Variable Weight Tandem Roller . . . and Huber's versatile Maintainer, which makes short work of year 'round street and highway maintenance jobs so varied it's hard to believe a single machine could handle them successfully. To get better acquainted with these dependable 1945 Hubers, write today for Tandem and Maintainer specification sheets.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER

3 WHEEL & TANDEM ROLLERS

YEAR 'ROUND MAINTAINER

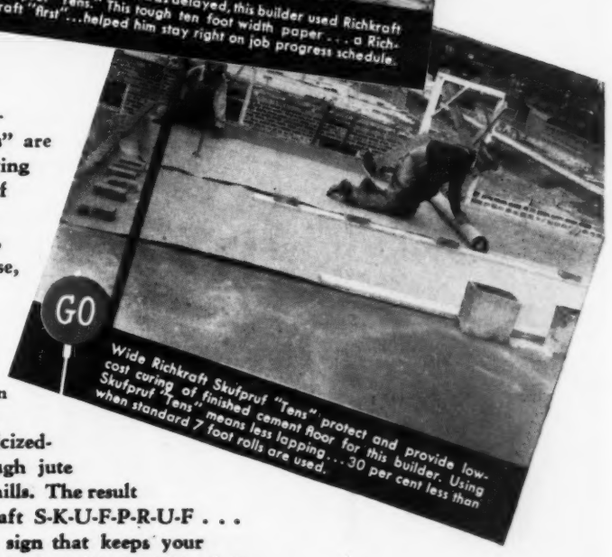
Richkraft

SKUFPRUF GREEN

...The Go Sign to ...keep your jobs rolling

GO
Richkraft paper makes the job of subfill protection easier and economical. This builder is "keeping his job rolling" ... and meeting Fed. Spec. UUP 264 ... with Richkraft.

GO
When roofing material was delayed, this builder used Richkraft Skufpruf "Tens." This tough ten foot width paper ... a Richkraft "first"...helped him stay right on job progress schedule.


GO
Wide Richkraft Skufpruf "Tens" protect and provide low-cost curing of finished cement floor for this builder. Using Skufpruf "Tens" means less lapping ... 30 per cent less than when standard 7 foot rolls are used.

HERE'S a real building paper . . . designed by construction men for construction uses . . . Richkraft Skufpruf "Tens" are our 10 foot rolls—the perfect width for curing floors, protecting materials stored in the open, etc. This ten foot width of Skufpruf covers 30 per cent more floor area with fewer laps . . . less labor.

Fewer laps mean fewer chances for floor damage. Added up, it means less labor—less trouble—more profit per job. (Of course, Skufpruf is available in regular standard sizes too.)

All Skufpruf paper has been given our special Plasticizing Treatment . . . not the surface or "Puddle treatment" commonly offered . . . Skufpruf Plasticizing is done to the raw kraft pulp itself. This means Richkraft Plasticizing becomes an integral part of the paper . . . a part of the wood fibre itself.

Here's what Richkraft Skufpruf is: Two sheets of plasticized-treated kraft, EACH coated with asphalt and combined with tough jute reenforcing . . . all done in one of the world's most modern mills. The result is a waterproof, scuffproofed paper, second to none. Richkraft S-K-U-F-P-R-U-F . . . easily identified by its green tint . . . Skufpruf Green . . .The go sign that keeps your jobs rolling in all kinds of weather. Write for the booklet "The Mills Behind Richkraft."

The RICHKRAFT Company

General Offices: Builders Building, Chicago 1, Illinois

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and Progressive Dealers . . . Nationwide . . . With Stocks On Hand Waiting to Serve You.

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ROAD MACHINERY • CRANES
There IS a Reason
Gar Wood—World's Largest Manufacturer of Truck and Trailer equipment—earned this leadership through ability to engineer and build units of such outstanding performance that men who know equipment best specify Gar Wood.
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TOUGHEST* OF THEM ALL IS

Caine CORR-PLATE Steel Piling

*POUND *for* POUND!

In its weight class, *it's the champ!*

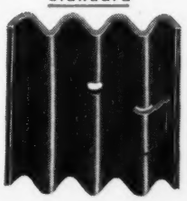
And here's why! The corrugations give it strength far beyond what you'd expect from its weight! There's nothing like Caine *Corr-Plate!* It's actually a cold rolled section . . . rolled similar to other steel shapes, but on special machines . . . the only ones of their kind!

Corr-Plate is made to order for those thousands of in-between piling jobs. It eliminates the waste of using needlessly heavy piling on hundreds of jobs where, heretofore, only excessively heavy piling was considered strong enough.

If you've got a piling job where use of Caine *Corr-Plate* is indicated . . . you're missing a bet if you don't use it!

AVAILABLE IN ANY LENGTHS

Standard



Interlock

Used the world over for building Foundations, Dams, Retaining Walls, Docks, Levees, Bulkheads, and thousands of other construction jobs, Sewers and Disposal Plants.

Investigate NOW

these and many other time-proven reasons why THOUSANDS OF ENGINEERS AND CONTRACTORS SWEAR BY "CAINE CORR-PLATE"

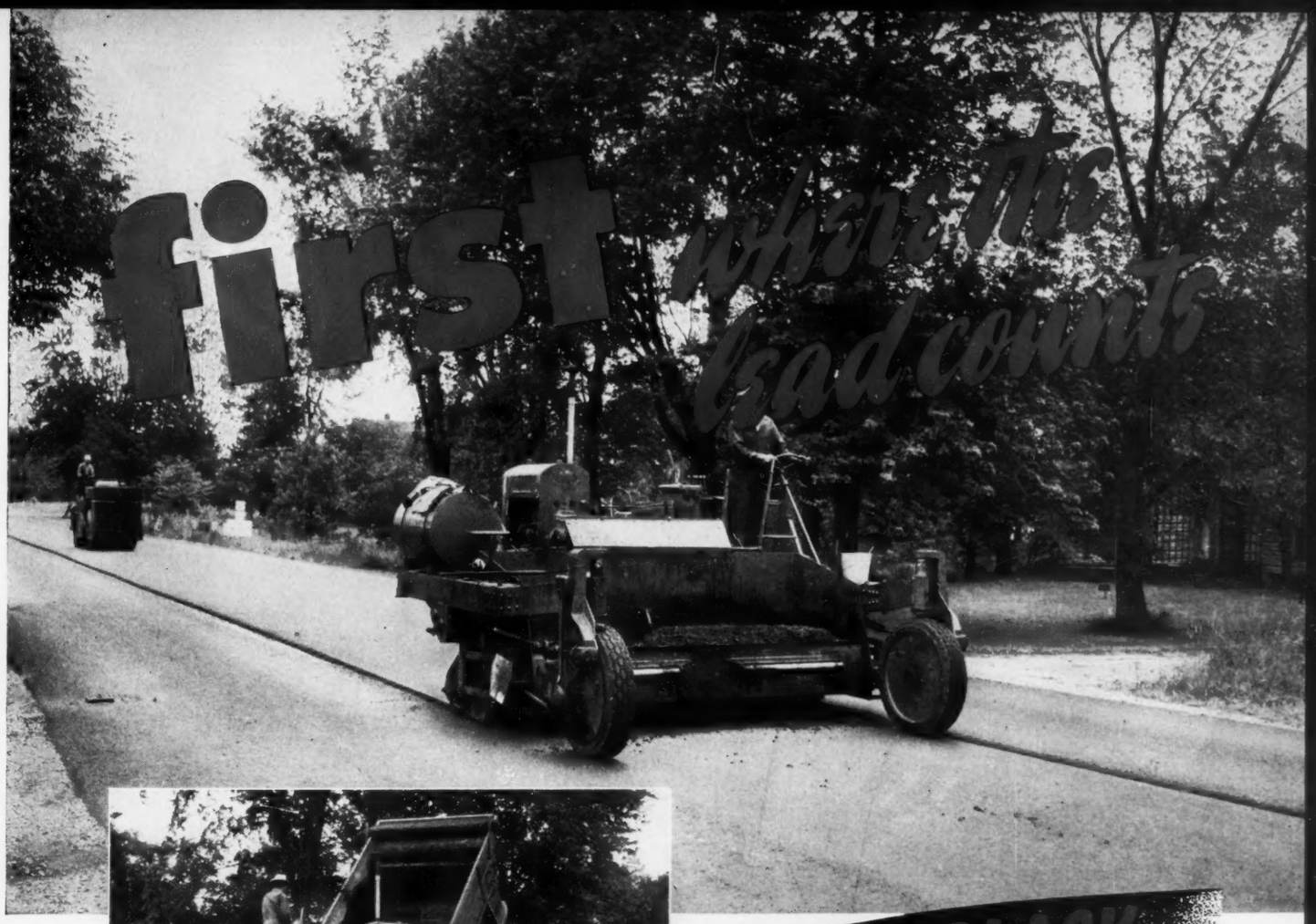
1. Easier to transport. (Nestable)
2. Easier to handle and set.
3. Easier to drive.
4. Easier to pull without distortion.
5. Easier to use over and over again.
6. Easier to set under existing structures.

Write for FREE Catalog

CAINE *Steel Company*

STEEL PILING DIVISION
1820 N. Central Avenue
CHICAGO 39, ILLINOIS

Its Economy begins above ground...
...and endures through the years in service!
STARTING from the time you load its 13-foot lengths onto your trucks . . . continuing during its rapid assembly in the trench . . . and lasting throughout its long, dependable service underground, Transite Sewer Pipe makes important contributions to more efficient, economical sewage disposal.
Check these money-saving advantages:
FAST INSTALLATION. Transite's light weight means easier handling; its long 13-foot lengths reduce the number of joints in the line, speed up assembly.
LESS INFILTRATION. Its floating sleeve-type joint combines flexibility with tightness . . . guarding against costly infiltration and cutting down on the load at the disposal plant.
HIGH DELIVERY CAPACITY. The smooth interior surface of this asbestos-cement pipe assures high delivery capacity . . . frequently permits smaller pipe, or flatter grades with correspondingly shallower trenches.
CORROSION-RESISTANT—outside, inside and all the way through! Transite's high corrosion resistance has been proved in countless installations, under a wide range of soil conditions.
If you are planning sewage works projects for the days ahead, you will want all the facts about Transite Sewer Pipe. Brochure TR-21A is free on request. Address Johns-Manville, 22 East 40th St., New York 16, N. Y.
JOHNS-MANVILLE JM PRODUCTS
Johns-Manville TRANSITE SEWER PIPE
FOR EFFICIENT, ECONOMICAL SEWAGE DISPOSAL



ADNUN BLACK TOP PAVERS

ADNUN PAVERS were first in the field and have kept the lead where improvements mean dollars saved to road builders. Adnun is the first and only paver suitable for laying slag, soil cement, gravel and crushed rock in addition to any bituminous material—hot or cold. . . . First with a big 6-cylinder, 50 h. p. engine capable of handling the biggest loads on any grade with the positive traction of four-wheel drive. . . . Adnun firsts in operating economy are reported by owners* who have used other pavers, and are a direct result of careful design and long job experience.

Continuous Course Correction, oscillating cutter bar, positive strike-off, lever-adjustment for crown, raker bar in hopper for pugmill mixing and breaking action power cutoff . . . all contribute to fast, accurate laying of smoother finished pavement with minimum subgrade preparation and waste. Any width strip, from 6 to 12 feet, any depth, can be laid with minimum preparation of shoulders or subgrade. One man at the hydraulic controls is the Adnun's working crew

For further details on other Adnun Firsts, ask an Adnun owner, see your nearest Foote Distributor, or write direct.

THE FOOTE COMPANY, INC.

1910 State Street **Nunda, N. Y.**

** Names on request.*

ARMY E NAVY

ADNUN

TRADE MARK REGISTERED

BLACK TOP PAVER

WITH CONTINUOUS COURSE CORRECTION

FEWER APPLICATIONS

BECAUSE PROTECTION

USE THE FAMOUS

TEXACO

TUNE IN THE
TEXACO STAR THEATRE
WITH JAMES MELTON
EVERY SUNDAY NIGHT—CBS

TEXACO

NEEDED...

LASTS LONGER WHEN YOU CHASSIS LUBRICANT THAT...

★ **Resists squeeze-out**

★ **Seals out dirt and moisture**

★ **Stays in bearings under all temperatures**

TRACTORS, graders, shovels, trucks and other construction equipment last longer, maintenance costs go down, when you lubricate them with long-lasting *Texaco Marfak.*

Marfak is one of the most famous of all Texaco lubricants. It is far more than a mere "grease". This unique product, designed especially for chassis lubrication, is both tough and adhesive. It cushions parts against road shock and clings tenaciously to bearing surfaces despite high speeds, heavy loads and extremes of temperature.

In addition, *Texaco Marfak* has the extraordinary characteristic of forming a fluid film inside a bearing while retaining its original consistency at the outer edges—thus sealing itself in, sealing out dirt and moisture. Its high resistance to squeeze-out means greater protection with fewer applications.

For wheel bearings, the right lubricant to use is *Texaco Marfak Heavy Duty.* It stays *in* the bearings, assuring safer braking. No seasonal change is required.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

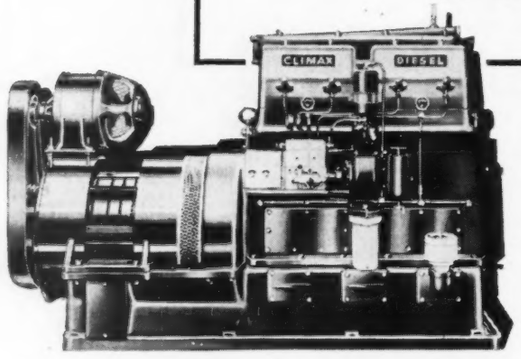
FOR ALL CONTRACTORS' EQUIPMENT

FOR LOWER-COST POWER and LIGHT

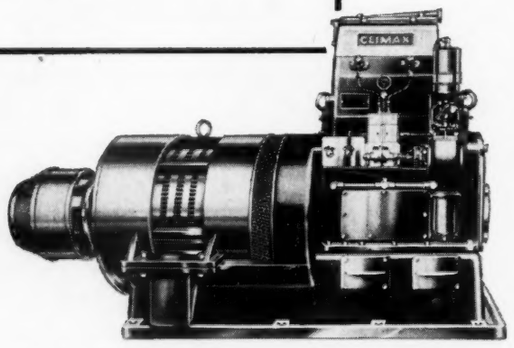
CLIMAX

DIESEL ELECTRIC PLANTS

15 and 30 kva



CLIMAX MODEL DE-297 Electric Plant consisting of Climax 4-cylinder Diesel Engine direct connected to 30 kva generator.



CLIMAX DIESEL ELECTRIC PLANT MODEL DE-148 consisting of Model D-148 2-cylinder engine direct connected to 15 kva generator.

Abundant electric power and light at less than 1c per kwh is delivered by these quick-starting, smooth running Climax Diesels. They consume less than ½ pint of Diesel fuel oil per horsepower hour.

THAT'S WHY these sets are widely used to reduce demand charges in industrial plants, to supply electricity wherever purchased power is costly or unavailable—and to supply *primary* power to boats, construction and oil field installations.

Engines are 2 and 4 cylinder, solid injection full Diesels, with maximum ratings of 22 and 44 h.p. at 1200 r.p.m. Mechanically simple, 4-stroke-cycle engines, with rigid one-piece castings of cylinder block and crankcase, assuring smooth, dependable operation. Instant starting by either local or remote control.

Standard equipment includes American Bosch fuel pump and injection nozzles, positive lubrication and cooling and electric starting equipment. Engines also available *without generators* for mechanical drives.

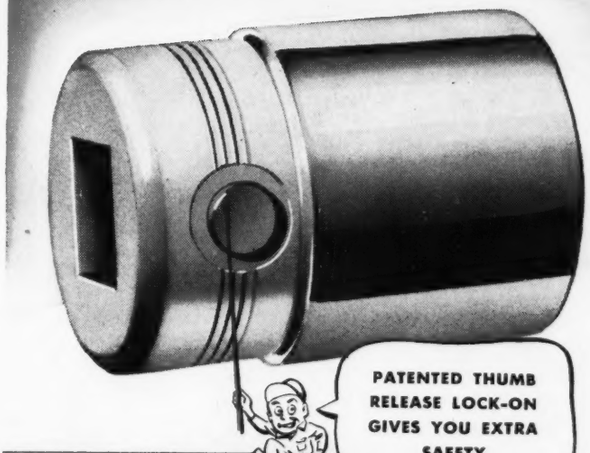
For complete information and specification bulletin, write Climax Engineering Company, Clinton, Iowa. *Regional offices: Chicago, Ft. Worth, Tulsa, Los Angeles.*

climax
GENERATING SETS
Builder of Climax BLUE STREAK and DIESEL ENGINES
CLIMAX ENGINEERING COMPANY

EVERY WAY YOU LOOK AT 'EM . . .

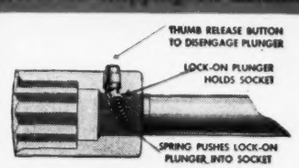
CONSTRUCTION'S Best SOCKET Wrenches are

BLACKHAWK

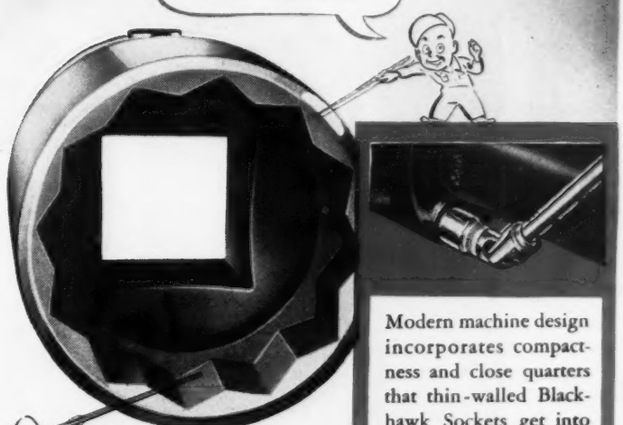


PATENTED THUMB RELEASE LOCK-ON GIVES YOU EXTRA SAFETY

BLACKHAWK "LOCK-ON" prevents sockets from sticking in tight places or dropping off accidently.



STURDY BUT THIN WALLS GET 'EM INTO TIGHT QUARTERS



Modern machine design incorporates compactness and close quarters that thin-walled Blackhawk Sockets get into easily to speed up maintenance and repairs.

CLEAN, HOT BROACHING MEANS LONG SOCKET LIFE AND LESS NUT WEAR

...AND BLACKHAWK HAS ALL THE DRIVES TO SERVE A COMPLETE RANGE OF SOCKET SIZES. THE HANDLES AND ACCESSORIES ALSO HAVE EXCLUSIVE UNMATCHED FEATURES!

Depend on Blackhawk and Blackhawk Industrial Supply Distributors for wrenches that offer industry the greatest safety, service and savings. See your distributor or write us.

A PRODUCT OF

Blackhawk Mfg. Co., Dept. W23115, Milwaukee 1, Wis.

LAY·SET'S **GREEN·LUBE**

• GREEN-LUBE *is a superior grade lubricant made to our own specifications. It clings to the wires longer—protects them better—enables them to give increased service.*

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Conn.

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

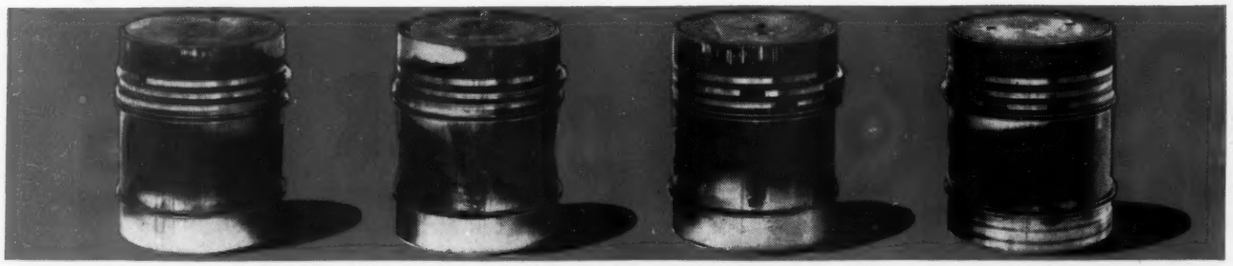
ACCO TRADE MARK

In Business for Your Safety

MAKES IT STILL BETTER

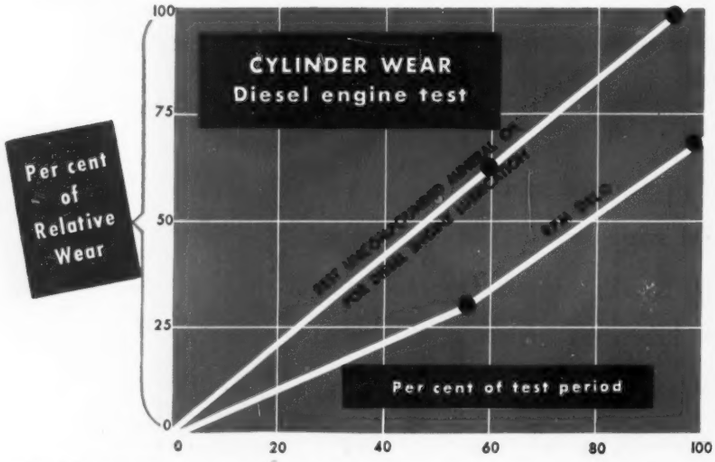
HAZARD'S All-Green rope is **LAY-SET** Preformed made of Improved Plow Steel — the best rope. Now this rope is *still better,* because it is completely protected with GREEN-LUBE *Every strand* is packed with our new superior green lubricant which gives added life to every wire. Not a single strand, not two strands, but every strand—yes, even every individual wire is completely covered by GREEN-LUBE The all-green color is an added protection to the highest grade rope made: **LAY-SET** Preformed I. P. S. Use only Hazard's All-Green rope.

How RPM DELO Oil keeps Diesel pistons clean

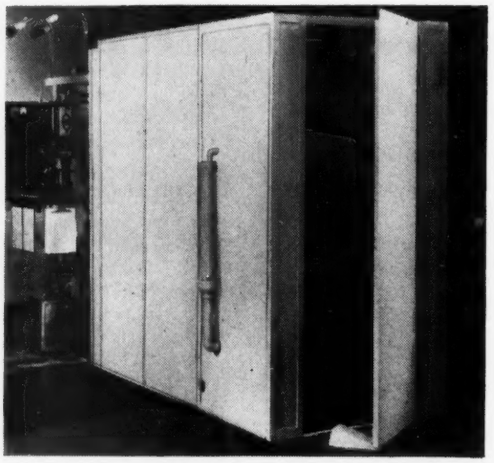


After only 265 hours of operation using the best *uncompounded mineral oil*, these Diesel test engine pistons were coated with a heavy, sticky gum-carbon deposit, as shown in this actual photo. The few bright areas were kept clean by rubbing cylinder walls. Oil ring slots were clogged, and blowby, resulting from stuck rings, caused a deposit of gum to form on cylinder liners. The engine was run on 80% load in a "Hot Box" where the air to the radiator was maintained at 125° F., simulating severe summer operation in high temperature areas.

Run five times longer under the same conditions, using RPM DELO Diesel Engine Lubricating Oil, the same engine's pistons were practically clean, as this photo shows. After 1200 hours, all the rings were free and unstuck. There was no appreciable amount of carbon formation in oil ring slots and the ring grooves were free from carbon deposits. Special, patented compounds in RPM DELO Oil give it this unusual ability to keep engines clean. They resist the formation of gum and varnish, remove deposits and keep contaminants in suspension.



How cylinder wear is reduced by minimizing gum-carbon and varnish formation on Diesel engine pistons through the use of RPM DELO Oil is shown by the above chart. For other charts, tests and a complete technical report on RPM DELO Oil, write for Booklet T-7, Standard of California, San Francisco 20, California.



This "Hot Box" cabinet is used in the laboratory to test Diesel lubricants in engines. It is the one mentioned above. In many devices, RPM DELO Oil is checked under conditions far more severe than are likely to be met in the field.

HIGH QUALITY, NATURALLY STABLE BASE OIL
Detergent compound to clean engine.
Anti-oxidant to prevent gum and sludge.
Wear-reducing compound.
RPM DELO
DIESEL ENGINE LUBRICATING OIL

STANDARD OF CALIFORNIA

RPM DELO Oil has world-wide distribution under the names: RPM DELO, Caltex RPM DELO, Signal RPM DELO, Imperial RPM DELO (CONCENTRATE)

NOW.....

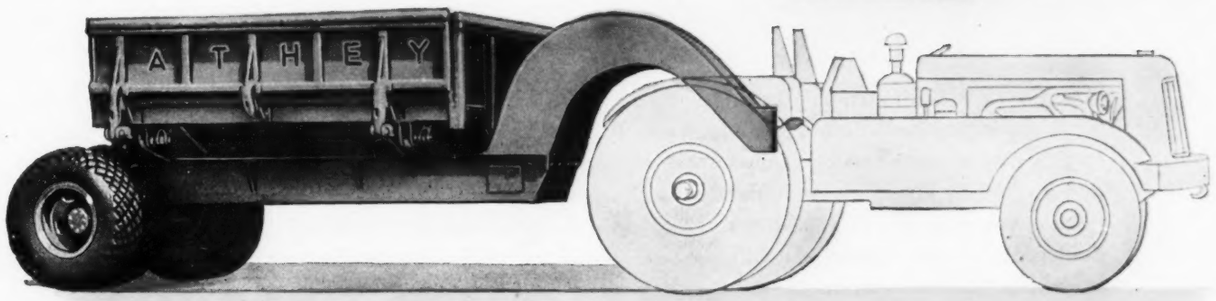
Athey Trailers

APCOR

RIDE ON RUBBER!

Since 1922, Athey has built a complete line of trailers and wagons, establishing a world-wide reputation for dependable equipment. Now, with its experienced engineering skill and manufacturing background in the trailer field, Athey announces a heavy-duty, 2-way dump trailer *on rubber tires.* Matched with the "Caterpillar" DW10 Rubber-tired Tractor in capacity and strength, the new PD-10 Trailer has such features as: fast, positive hydraulic control; 10 cubic yard capacity; discharge to either side; sturdy, long-life design and construction. Find out more details about the new PD-10 Trailer. Your Athey-"Caterpillar" Dealer can give you full facts or you're invited to write direct to ATHEY PRODUCTS CORPORATION, 5631 W. 65th Street, Chicago 38, Illinois

2-WAY DUMP — POSITIVE, HYDRAULIC CONTROLS
The new Athey PD-10 is 2-way dump — a money-saving advantage on many types of jobs; has fast-acting, positive hydraulic controls.



Athey APCOR

DEPENDABLE LOADING & HAULING EQUIPMENT

First OF A Great *New* "CATERPILLAR" Line!

"Caterpillar" Bulldozers are here—first in a mighty line of earthmoving equipment designed, built and backed by the same manufacturer that makes the tractors which power it; sold and serviced by a single dealer; developed to bring you still greater advantages in getting "lowest costs on earth."

Forty years of "Caterpillar" earthmoving experience has gone into these complete-package bulldozers built to give perfect balance between power, traction and blade capacity; to include every design feature learned on the toughest tasks of war and peace; to insure one high standard of material and workmanship and to provide the top performance and long life which are traditional with "Caterpillar" products.

Proved in laboratory, on test field, and on the world's toughest jobs, "Caterpillar" Bulldozers are now ready to prove their advantages, stamina and long life on *your* jobs.

Your "Caterpillar" dealer will gladly give you full information on these rugged earthmovers. Better still, he will help you get them at the earliest possible date. Now, more than ever before, he is a good man to know. See him soon.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

BULLDOZERS WITH THESE OUTSTANDING ADVANTAGES:

- BALANCED DESIGN
- GREAT CAPACITY
- RIGID CONSTRUCTION
- REINFORCED BLADE
- EASY DIGGING
- ENCLOSED OPERATING CABLES
- LONG-LIFE CUTTING EDGES
- EASY BLADE ADJUSTMENTS
- QUICK MOUNTING
- UNIT MANUFACTURE
- ONE SERVICE SOURCE
- CORRECTLY GROOVED SHEAVES
- LONG CABLE LIFE
- SAFE OPERATION
- FINE VISIBILITY
- HIGH LIFT
- LOW DROP
- STRAIGHT OR ANGLING CUT

CATERPILLAR DIESEL

REG U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Plan NOW to TRAXCAVATE!

IT'S THE MODERN DIRT AND MATERIAL HANDLING METHOD

T-4 TRAXCAVATOR digging and loading material for road surfacing in Alabama at a rate of 60 yds. per hr.

Digging and loading old alley paving in a California city

T-7 TRAXCAVATOR digging through 12 inches of frost for Long Island, N. Y. housing project

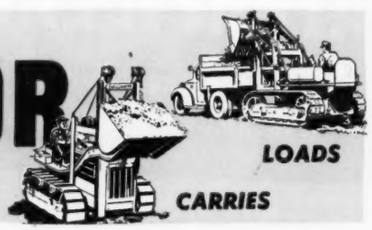
Now that the "go-ahead" signal has been given, your well-planned construction and maintenance contracts will get off to a flying start if you have planned to "TRAXCAVATE" — for it's the modern earth-moving and material-handling method. TRAXCAVATORS, the dependable tractor excavators, combine in one machine the usefulness of a Shovel, Loader, Scraper, Bulldozer, Anglegrader, etc. There's a wide choice of models with bucket sizes from ½ to 2½ cubic yards. Your nearby TRACKSON-"Caterpillar" dealer will be glad to give you the complete story, or write for informative literature to TRACKSON COMPANY, Dept. CM-115 Milwaukee 1, Wisconsin.

DIGS GRADES

TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR



LOADS CARRIES

A HAMMER TOOL FOR EVERY JOB
STAR DRILL: For clean round holes in concrete, brick, cement, etc.
BULL POINT: For demolition work on concrete, stone, brick, etc.
SPEED BIT: Cuts small holes faster than star or diamond drills.
COLD CHISEL: For chiseling, scaling, surfacing concrete or metal.
WOOD CHISEL: For cutting in wood and compositions.
BUSHING TOOL: For removing form marks or scuffing concrete surfaces.
SEAM TOOL: Cleans out old mortar between bricks or masonry for repointing.

Fast Electric Hammers Drive Down Your Costs . . .

on any job that uses tools like these

Black & Decker Electric Hammers save time and cut costs on many a tough job. They drill or channel in brick, stone or concrete . . . chip, clean and scale metal . . . gouge, shape and notch timber . . . drive spikes . . . tamp and vibrate concrete forms . . . scuff concrete surfaces and remove form marks . . . handle heavy demolition . . . save muscle and man-hours on countless jobs from seaming and caulking to tree surgery.

Light, compact and completely self-contained, a Black & Decker Electric Hammer requires no transformer or extra equipment . . . operates wherever there is an electric outlet, AC or DC, or from a portable generator. Made in four models, all rated by drilling capacity in concrete: For holes up to $\frac{1}{2}$" diameter, $85; to $\frac{3}{4}$", $115; to $1\frac{1}{8}$", $145; to 2", $195.

For full information, see your nearby Black & Decker Distributor. Or write for our "Hammer Handbook" to: The Black & Decker Mfg. Co., 659 Penna. Ave., Towson 4, Md.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC **TOOLS**

EXCAVATING FOR A PUMPING STATION IN FINE SAND AND CLAY — SUBGRADE 25′ BELOW NORMAL WATER LEVEL . . .

HOW WOULD *You* HANDLE THIS JOB?

It could be a costly operation, but an experienced contractor knows that with a MORETRENCH WELLPOINT SYSTEM handling the water, he will be free to dig it "in the dry"—to eliminate sheeting—to count on daily progress.

Your job may present more or less of a problem. In either case, send it in. MORETRENCH has the equipment, the experience, and the personnel to help you solve it satisfactorily and economically.

Catalog on request.

MORETRENCH CORPORATION

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NEW ORLEANS 13, LA.
321 Euterpe St.

No matter what Paint Vehicle is needed . . .

- SYNTHETIC RESINS
- NATURAL RESINS
- MODIFIED SYNTHETICS
- DRYING OILS

RED LEAD'S WIDE COMPATABILITY

makes its Extra Rust Protection Available

The fact that Red Lead is generally accepted throughout industry as the standard metal protective paint indicates two things:

1. *That it must be widely adaptable to various service conditions.*
2. *That it must offer something* EXTRA *in the way of rust prevention.*

Red Lead's versatility is due principally to its compatability with the wide range of vehicles needed to answer present-day service demands. It can be used with practically every type of paint vehicle on the market—synthetic resins, natural resins, drying oils, and combinations of these.

Thus, paints for any metal protective purpose can be formulated with Red Lead. Since almost any paint vehicle can be used with Red Lead, a broad range of drying requirements can be met—anything from the normal drying primer used on structural steel to the quick-drying paint essential to present-day production schedules.

Why Red Lead means Extra Rust Protection

Red Lead has the property of counteracting acid conditions, recognized as accelerators of rust. In the presence of various acids, Red Lead forms insoluble lead salts at the approximate rate at which the acids are supplied.

This is true whether the acid originates from acid-forming environments, such as gas, smoke and moisture in the atmosphere, or from the decomposition of the vehicle. Thus, a rust-inhibiting condition is maintained with a Red Lead paint.

Red Lead also forms an adherent protective shield which prevents electrochemical action, another prime cause of rusting.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a metal paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint.

No matter what price you pay, you'll get a better paint for surface protection of metal, if it contains Red Lead.

Write for New Booklet—"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas—ranging from Red Lead-Linseed Oil paints to Red Lead-Mixed Pigment-Varnish types. If you haven't received your copy, address nearest branch listed below.

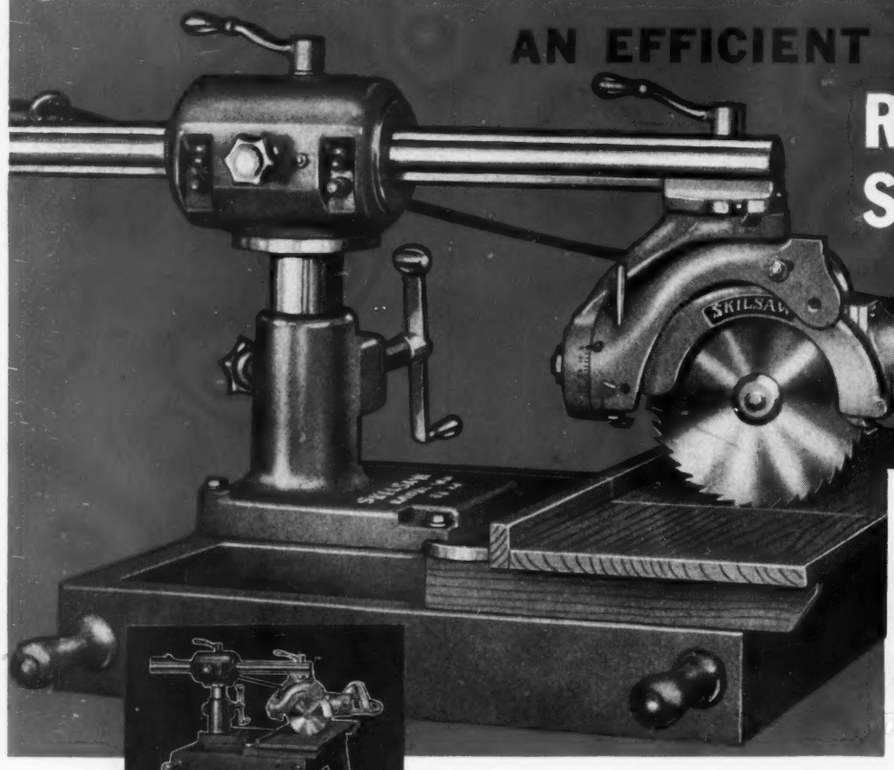
* * *

All types of metal protective paints are constantly being tested at National Lead's many proving grounds. The benefit of our extensive experience with paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston, W. Va. (Evans Lead Division).

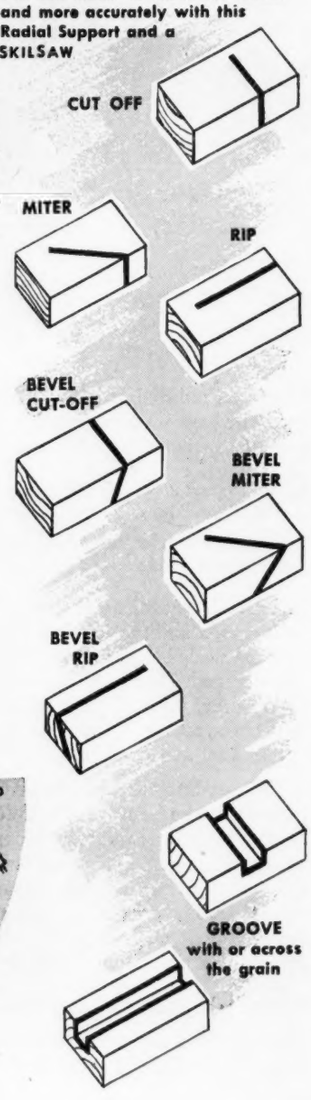
DUTCH BOY RED LEAD

THIS *New* RADIAL SUPPORT converts PORTABLE SKILSAW INTO AN EFFICIENT JOB-SITE RADIAL SAW!



Also available with steel legs

You can make all these cuts faster and more accurately with this Radial Support and a SKILSAW



● In a few minutes you can attach SKILSAW Model "77", "825" or "87" to this radial support and be all set to save time on all the cuts shown at the right. You save layout time . . . one piece serves as a pattern for thousands. You save cutting time by gang-cutting materials. You save material by cutting random lengths into usable lumber.

THEN . . . you can quickly detach Portable SKILSAW and take it right to the work . . . make every cut for which Portable SKILSAW is famous, from foundation forms to sheathing and roof decking.

See your distributor for a demonstration!

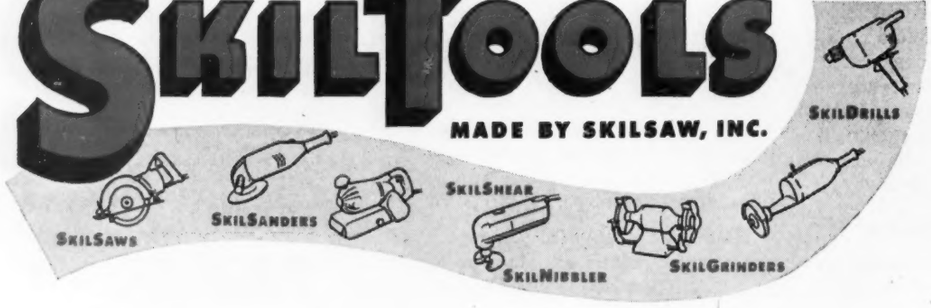
SKILSAW, INC. 5033-43 Elston Ave., Chicago 30, Ill.

Factory Branches in All Principal Cities

PORTABLE ELECTRIC

SKILTOOLS

MADE BY SKILSAW, INC.



Aluminum gave their derricks that "boarding-house" reach

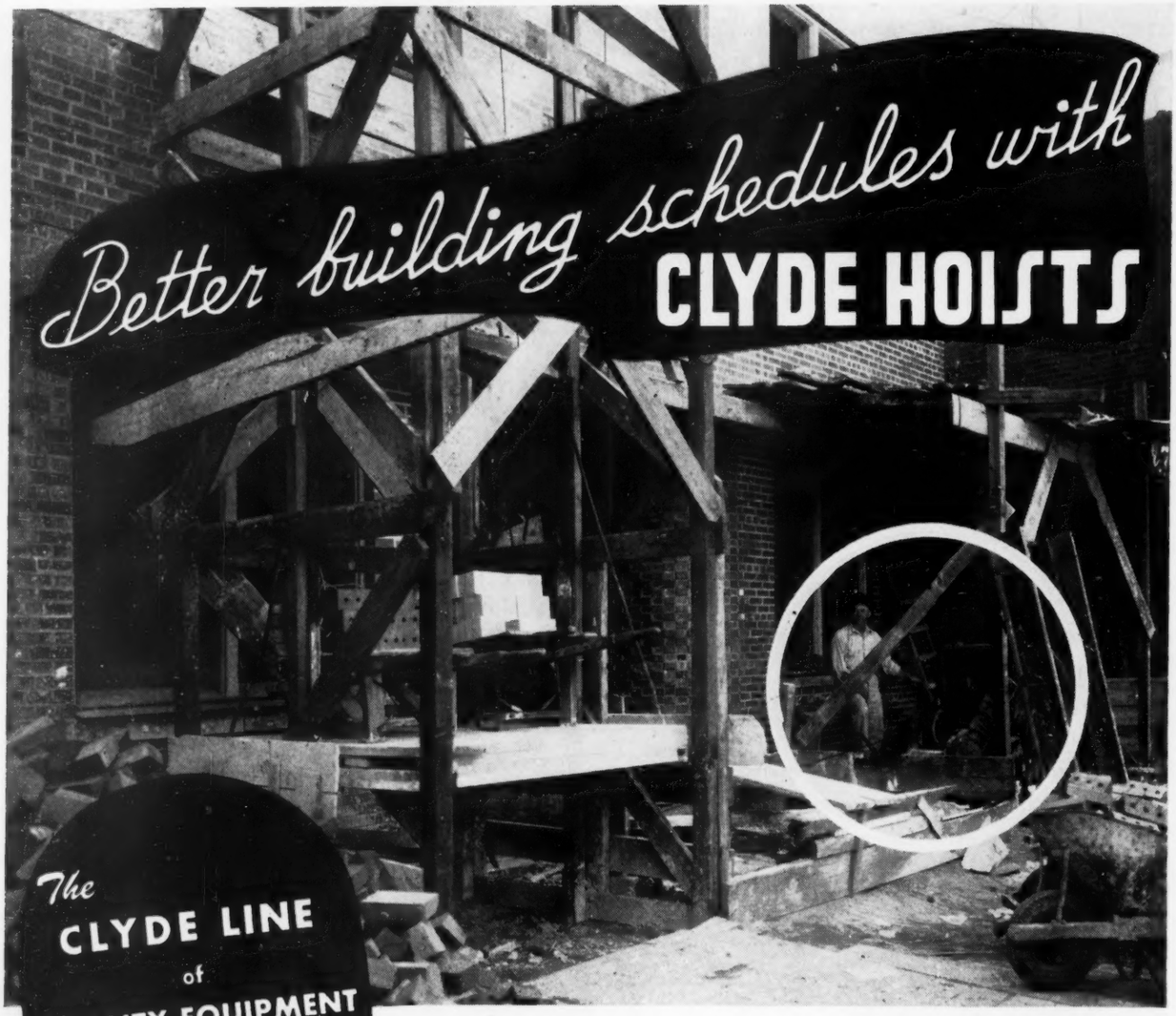
Extra length was needed for setting higher poles on the pole-handling derricks of the Dayton Power & Light Company. The trucks had the "heft to swing it", so the problem was to increase the reach without overloading the trucks.

Alcoa Aluminum was used to build derricks 23% longer. The aluminum tubing did more. It increased the efficiency by reducing the weight of the derrick 25%. These derricks have been on the job six years and the company reports "results are very satisfactory".

Alcoa engineers assisted in planning this Dayton Power & Light Company use of aluminum. They'll be glad to help you, too. Write ALUMINUM COMPANY OF AMERICA, 1865 Gulf Bldg., Pittsburgh 19, Penna.

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM



The
CLYDE LINE
of
QUALITY EQUIPMENT

- HOISTS
- DERRICKS
- WHIRLEYS
- CAR PULLERS
- HAND POWERS
- BUILDERS TOWERS
- MINE HOISTS
- WINDLASSES
- WINCHES
- PILE DRIVERS
- BARGE & DREDGE MACHINERY

Whether it's the small but efficient Clyde gasoline hoist shown above or any other item in the Clyde line of quality equipment, you can depend upon it to step-up your building schedules.

Clyde equipment is unsurpassed in performance, dependability, safety and economy. Every part of every unit is scientifically engineered for its particular duty. Every piece is carefully and accurately constructed of the finest materials.

Plan now to use Clyde hoists on your next job. Write for bulletins on any type of Clyde equipment and compare their many points of superiority.

CLYDE

CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

PROFESSIONAL TRUCK OPERATORS

use Chevrolet trucks to deliver the goods

ONE OUT OF EVERY THREE TRUCKS IS A

CHEVROLET TRUCK

Buy Victory Bonds

CHEVROLET

. . . over all kinds of roads—in all kinds of weather—day after day and night after night

Professional truck operators—whose vehicles deliver goods for the nation's business and industry—have but one source of income. That is *the earning power of their trucks.* . . . To meet competition and operate at a profit, professional operators *must* have trucks that combine efficiency and economy. Their trucks must have ample power—to move their loads speedily and smoothly. They must have dependability—to remain on the job day in and day out. *And—above all—they must be low in first cost, low in operating costs, low in maintenance costs.*

Chevrolet trucks provide these essential qualities in correct balance—no one quality over-developed at the expense of another, no one quality skimped. That is why so many professional operators choose Chevrolets . . . why Chevrolet trucks have led all other makes in sales in seven out of the last nine prewar years . . . why one out of every three trucks on the road today is a Chevrolet.

Buy the truck that many professional truck operators buy. . . . Buy the truck that saves you money. . . . *Buy a Chevrolet.*

CHEVROLET MOTOR DIVISION, *General Motors Corp.*, DETROIT 2, MICH.

PAGE BUCKETS ARE USED ALL OVER THE WORLD

From war-torn China, from liberated islands in the South Pacific, from the most remote corners of the world, come reports of how Page *Automatic* Buckets are successfully day after day doing the job for which they were designed.

The Bucket illustrated is a 25-cubic-yard *Automatic*

PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

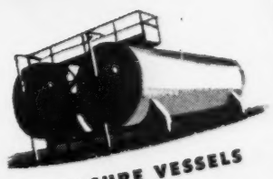
6 IDEAS IN STEEL

REFRIGERATOR CARS

STEEL BUILDINGS

SPECIAL STRUCTURES
Palomar Telescope Dome

DAM TRESTLES



PRESSURE VESSELS

DRUM GATES

Of the many and varied uses of steel, six are presented here to show the kind of jobs Consolidated Steel is prepared to help you plan and build now.

If your construction plans call for precision steel fabrication, Consolidated Steel is ready to offer you capable, immediate service. Address Consolidated Steel Corporation, Los Angeles 22, California; or Orange, Texas.

Consolidated Steel

FABRICATORS
ENGINEERS
CRAFTSMEN

LEADERS IN THE WEST AND SOUTH

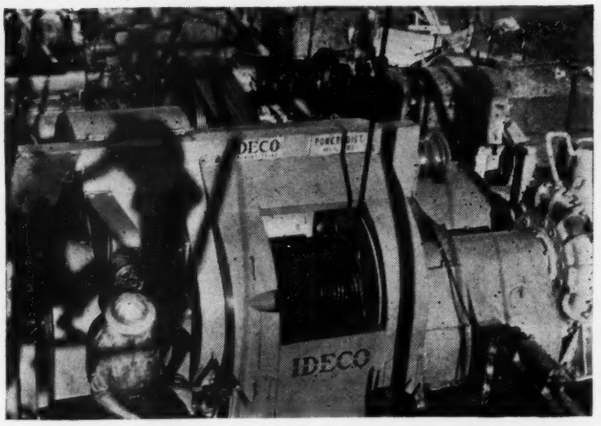
THE CLUTCH THAT STOPPED CLUTCH TROUBLE

Here is the one truly modern clutch for all heavy duty industrial drives.

It controls power and torque through a cushion of air —with as firm a grip or as light a grip as the job requires. It has no springs, arms, levers or toggles—requires *no* lubrication and little maintenance.

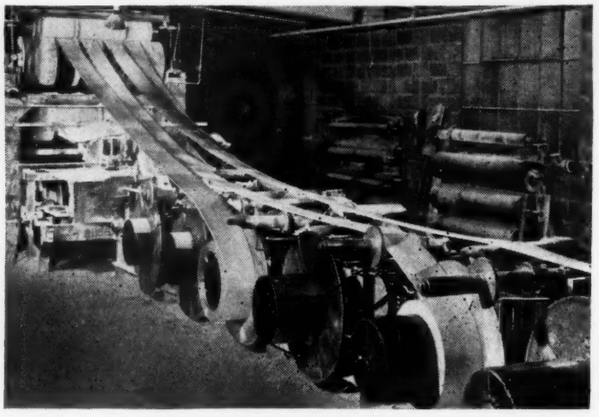
It is the Fawick Airflex Clutch—proved for superior performance and economy—in hundreds of industrial applications and in thousands of Diesel-driven Navy ships.

Let us help you engineer clutch trouble *out* of your machines. Book on request.

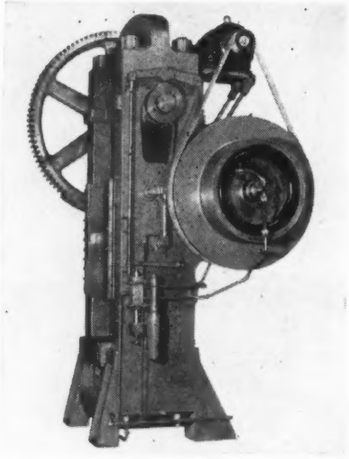


Oil-well drilling rig—equipped with 11 Fawick Clutches.

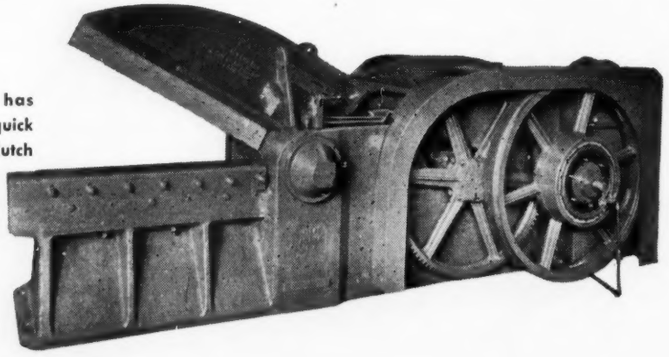
▲ Modern power shovel gives full-time operation through dependable Fawick Clutches.



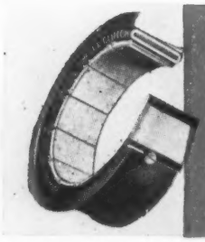
Steel rolling mill Fawick-equipped for smooth, even power.



◀ Heavy duty press has smooth starts and quick stops with Fawick Clutch and Brake.



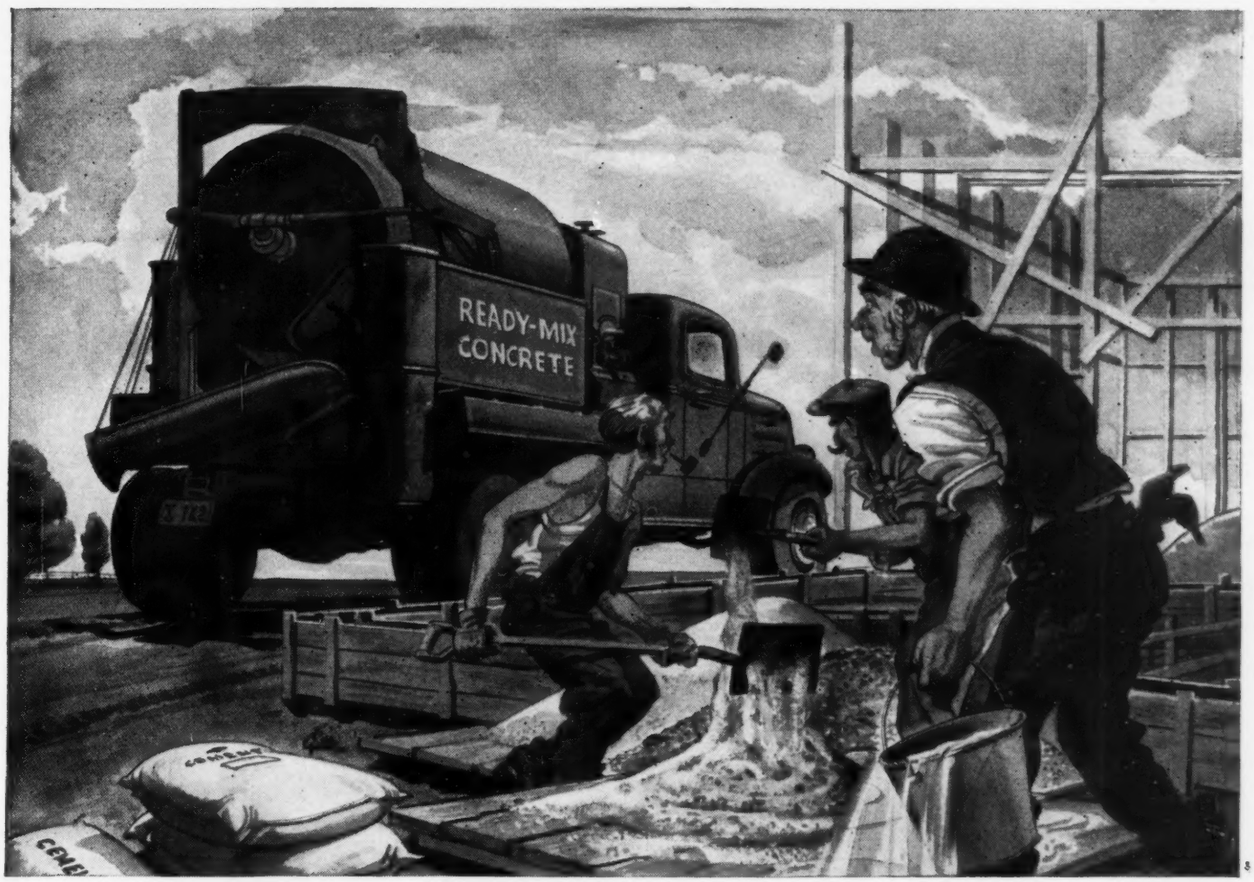
▶ Alligator shear operates through Fawick Clutch and Brake.



FAWICK *Airflex* CLUTCH

FAWICK AIRFLEX CO., INC. • 9919 Clinton Road, Cleveland 11, Ohio

In Canada, Reynold-Coventry Ltd., Montreal, Toronto, Vancouver • In Britain, Crofts Engineers, Ltd., Bradford, England



There's been a big change

★ In the early 1900's, a trough and a hoe mixed concrete adequately. Similarly, ordinary tapered roller bearings were once completely adequate.

But with the advent of modern machinery, a better bearing was needed. So Tyson developed a modern bearing with *30% more rollers around the raceway*—a revolutionary "All-Rolls" bearing.

"All-Rolls" means more capacity in every job . . . more strength and rigidity . . . practically doubled bearing life.

That's why the trend is toward the "All-Rolls" bearing—in industry and agriculture, in construction and transportation. That's why the big name in bearings today is . . . . . TYSON.

TYSON BEARING CORPORATION • MASSILLON, OHIO

COUNT THE ROLLS · THE ROLLS COUNT

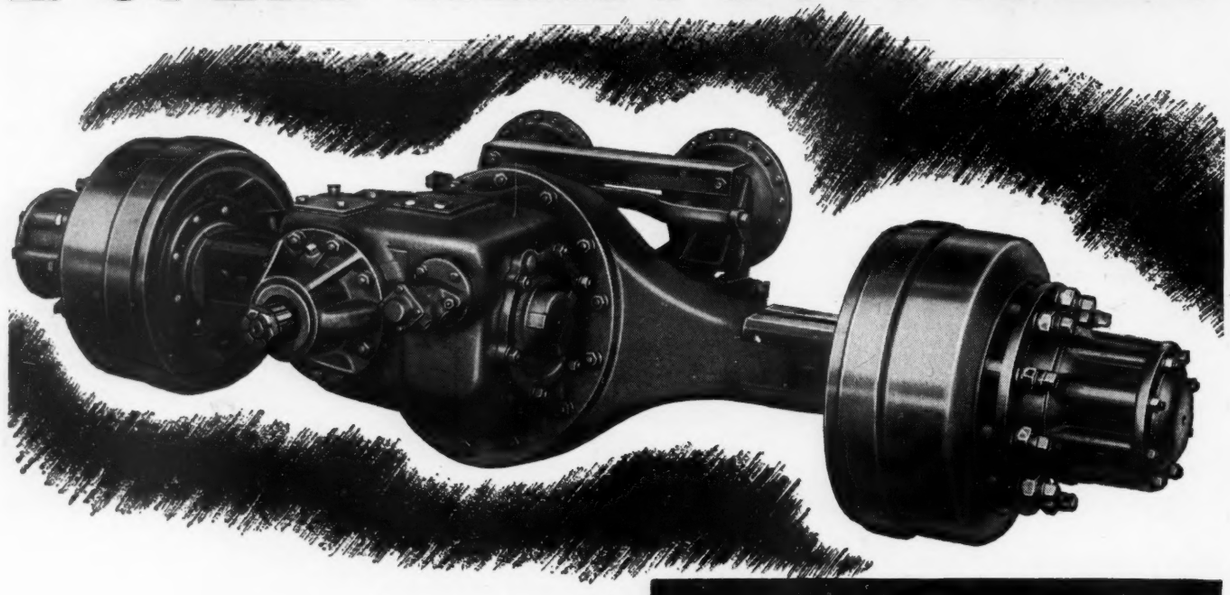
Tyson

"All Rolls" BEARINGS for HEAVY-DUTY SERVICE

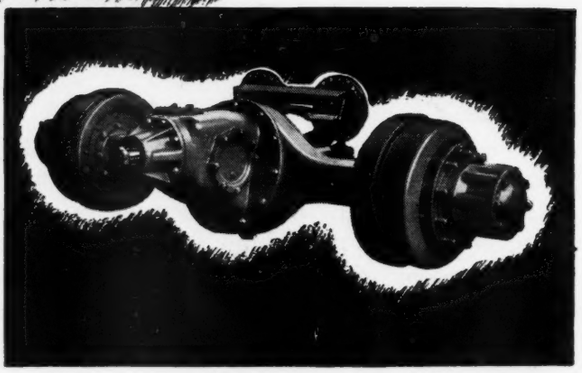
NEW!

S-300 P and U-300 P

2-SPEED HEAVY DUTY AXLES



Companion Axles to the Famous S-200 P and U-200 P ➔



Above, the famous Timken S-200 P and U-200 P Double Reduction Axles which are making such outstanding performance records on tough hauling jobs everywhere. The S-300 P and U-300 P are companion axles to the above.

2-Speed Hypoid-Helical Double Reduction Final Drive used in Timken S-300 P and U-300 P Axles.

These new heavy duty axles by Timken are equipped with time-proved Timken Easy Power Shift—have a new 2-speed double reduction final drive unit that employs hypoid gearing for first reduction and helical gearing for the second step, thereby combining the full advantages of these two types of gearing. Both the S-300 P and the U-300 P Series have the same rugged construction . . . combine all of Timken's time-tested features with many improvements . . . the two types of differential carrier assemblies (2-speed double reduction and double reduction single speed) are interchangeable in the same axle housing. The S-300 P is intended for heavy duty hauling on highways and city streets. Torque capacity is ample for modern high power engines. The U-300 P is for off-the-highway operations, using the same engine torque, but where still greater load carrying capacity is required.

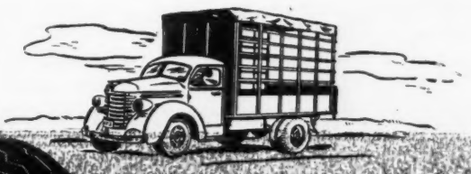
TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICHIGAN
WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN

Our tires have to be *dependable!*

B. RABINOWITZ
Newark Fruit Co.
New Haven, Conn.

● **"In making rapid produce hauls our drivers are guided by one rule: perishable foods must arrive at the market on time. Even a brief highway delay may mean the loss of an entire day's business. Our tires have to be dependable—that's why we buy Armstrongs!"**



HUNDREDS of tire-wise commercial car operators are now acutely aware of this important fact: *you can't buy a better tire than an Armstrong!* Since 1912 Armstrong has pioneered in making tires that wear longer and cost less. You can count on Armstrong to give you a tire that will perform better, last longer, stand up under all conditions and cost you less per mile of use. That's not a statement—it's a promise!

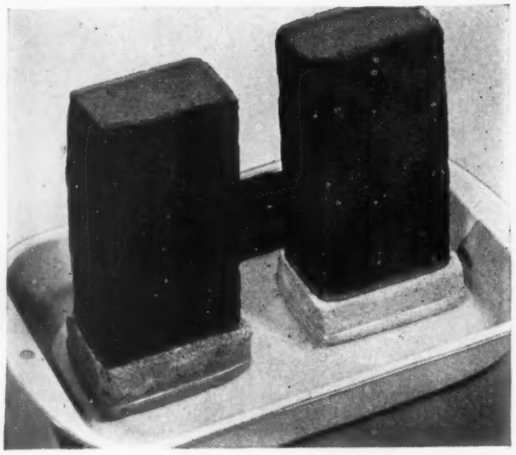
For literature or information write your Armstrong Distributor or to Armstrong Rubber Company.

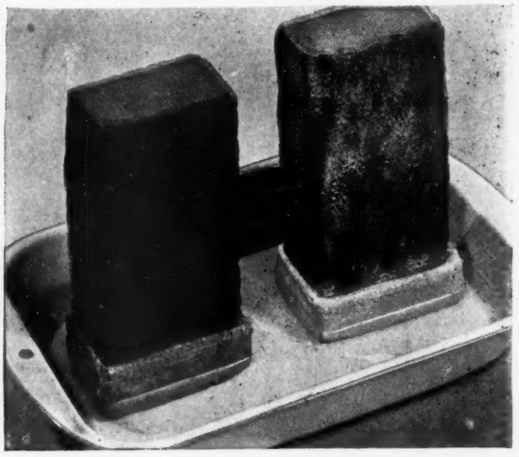
ARMSTRONG TIRES

Manufacturers of Quality Tires and Tubes Since 1912 · General Offices and Plant— 460 Elm Street, West Haven 16, Conn.

BRIXMENT MORTAR

Helps Prevent Efflorescence





To test two mortars for resistance to efflorescence, "cap" two brick heavily with the mortars — let harden, and keep both brick for a few weeks in a shallow pan of water, as shown. Try this with Brixment mortar!

HERE'S WHAT CAUSES EFFLORESCENCE—AND WHY BRIXMENT MORTAR HELPS CONTROL IT

Efflorescence is an outcropping of minute white crystals on brickwork. When these crystals occur on colored mortar joints, the condition is sometimes mistaken for *fading.*

Efflorescence is caused by the presence of soluble salts in masonry materials. When reached by water, these salts dissolve, and are drawn by evaporation to the surface of the wall.

Brixment itself *does not cause efflorescence* because it is practically free from soluble salts. Even when such salts are present in the sand or brick, the waterproofing in Brixment usually *prevents them from coming to the surface.*

Bricklayers who have used Brixment mortar for years say they have far less efflorescence with Brixment than with any other mortar.

LOUISVILLE CEMENT CO., Incorporated, LOUISVILLE 2, KENTUCKY

CEMENT MANUFACTURERS SINCE 1830

PMCO

America's Most Complete Line of Material Handling Buckets

All purpose-

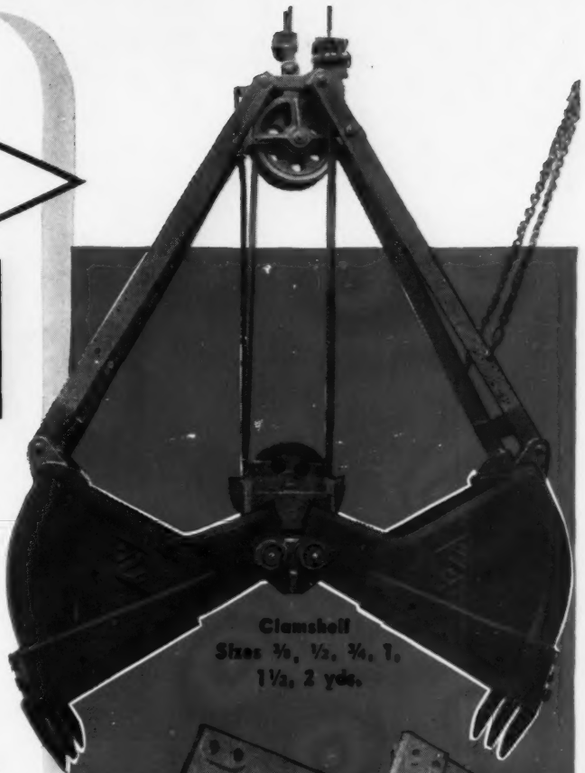
- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

• FRONTS, BOTTOMS, SCOOPS and TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

On the ½ yd. and ¾ yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable — a great advantage to operators.

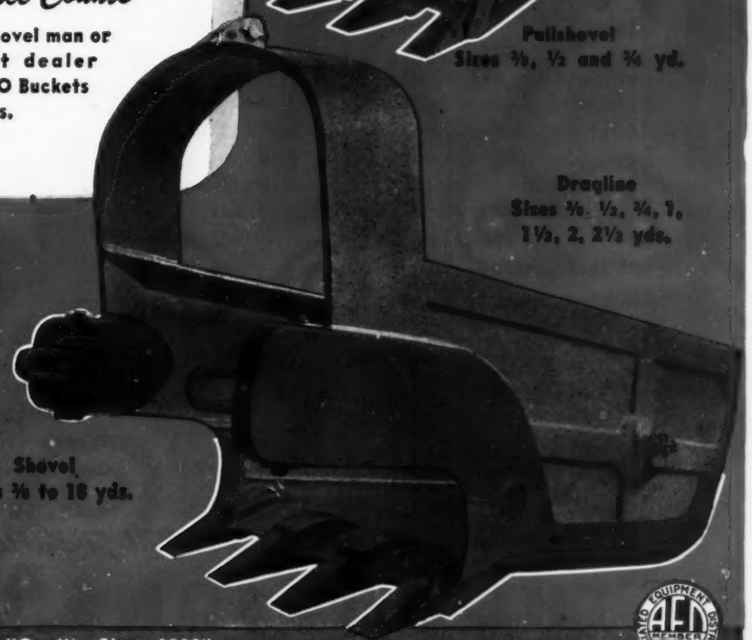
Experience Counts

See your shovel man or equipment dealer about PMCO Buckets and Dippers.

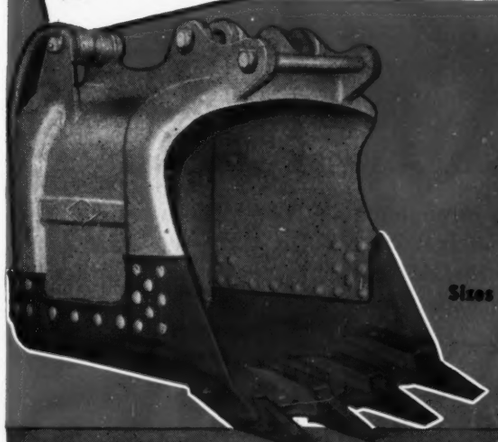


Clamshell
Sizes ⅜, ½, ¾, 1, 1½, 2 yds.

Pullshovel
Sizes ⅜, ½ and ¾ yd.



Dragline
Sizes ⅜, ½, ¾, 1, 1½, 2, 2½ yds.

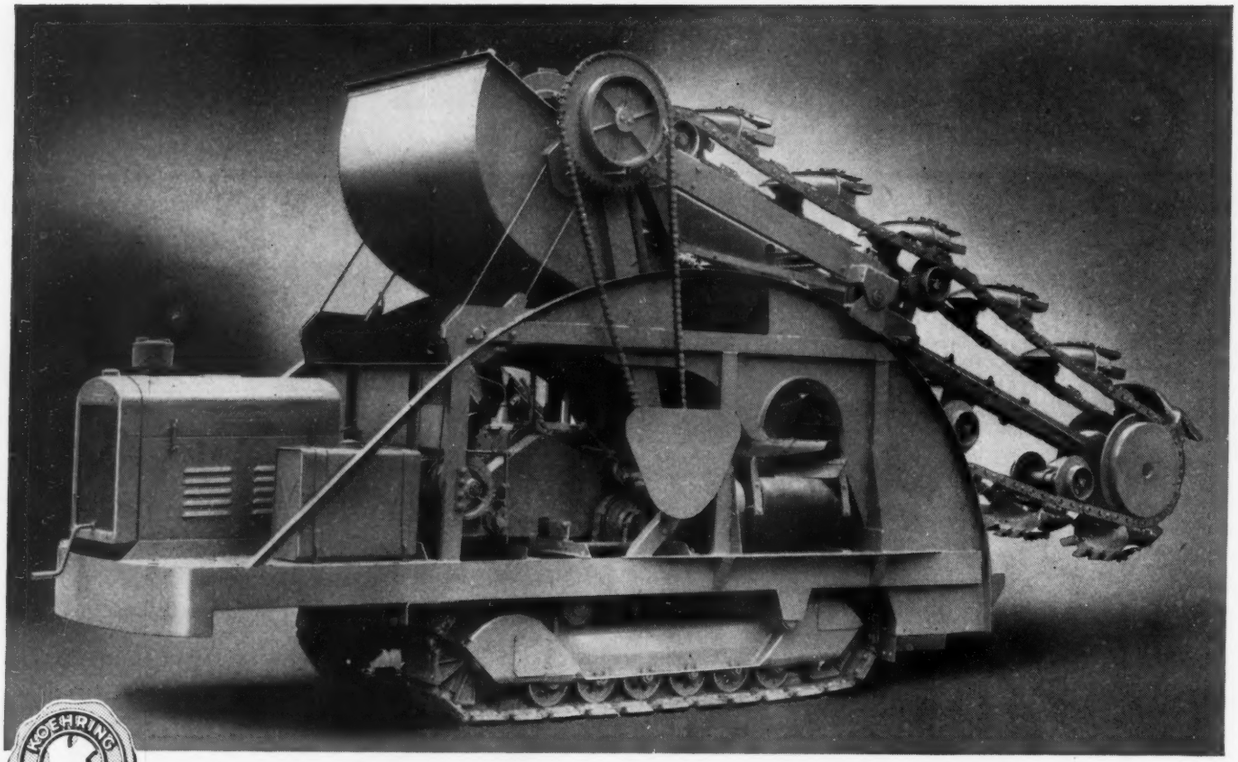


Shovel
Sizes ⅜ to 18 yds.

"Quality Since 1880"

PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.



KOEHRING PRODUCT

221 *Announcing Parsons* TRENCHLINER

TO complete its peacetime line of Trenchliners, the Parsons Company presents the Model 221. Its fields of application: All types of utility trenching, particularly in close quarters, and railroad drainage. Similar in design and construction to the well-known Parsons 250 Trenchliner, the Parsons 221 Trenchliner cuts trenches fast and easy, at low cost.

221 PERFORMANCE DATA:

Depth of Trench: Up to 8′

Digging Widths:

Buckets Only	16″	20″	24″
Special Teeth	22″	26″	30″
With Sidecutters	28″	32″	36″

Digging Speeds: 25—From 2″ to 113″ per minute

Traveling Speeds: 5—From ½ to 2¾ miles per hour

Digging through an old Iowa road surface at the rate of 3 feet per minute, trenching 24 inches wide, 5 feet deep. That's the type of performance you can expect from the Parsons 221 Trenchliner.

Ask for your Parsons 221 Trenchliner Catalog today.

THE PARSONS COMPANY

NEWTON, IOWA

TRENCHING EQUIPMENT PARSONS

Simple Arithmetic Says AIR

AIR PLUS JAEGER COMPRESSOR

75% to 100% larger, air-animated valves for free air flow, greater coolness, lower lift and, consequently, longer life.

5 to 10 times longer air retention above 90 lbs. pressure (20 to 25 minutes instead of the usual 2 to 4), proving the more positive closure and consequent higher efficiency of Jaeger "ultra lapped" valves and seats.

100% efficient intercooling (with automatic drainage during idling periods) delivers air under 100 lbs. pressure within 100° of ambient temperature.

20% to 30% slower, long-life piston speeds (800 f.p.m.) in a balanced "W" compressor unit precision built to operate without vibration.

30% to 50% larger air receivers for less frequent engine acceleration, fuel economy and cooler air.

100% positive force feed lubrication, protecting under all operating conditions.

60 to 500 cu. ft. models, offering as standard these and many other "PLUS" features (more horsepower, huskier main frames, lifetime clutches, bigger tool boxes, sectional radiators and intercoolers, interchangeable Timken bearing steel and pneumatic tired wheels, "Auto-Steer" axle on all 4-wheel trailers, etc.) are available thru . . .

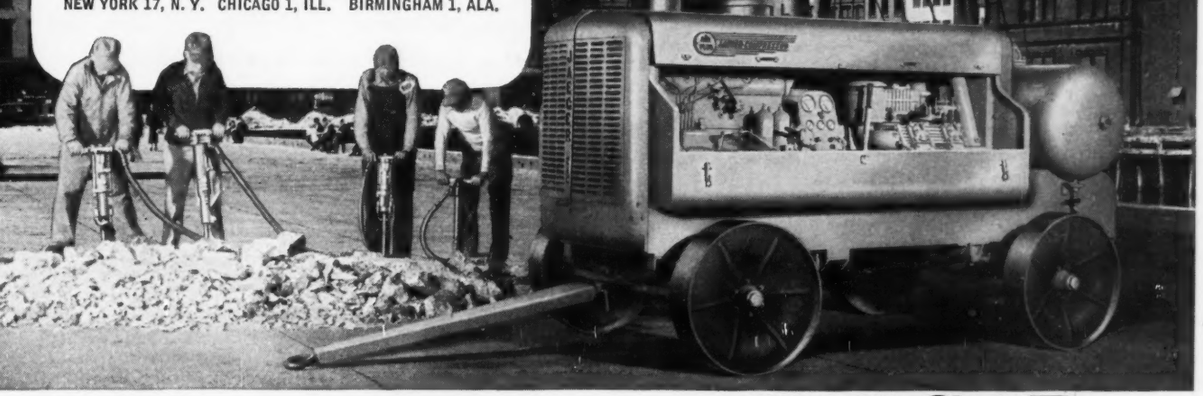
MORE THAN 100 Jaeger distributors coast to coast.

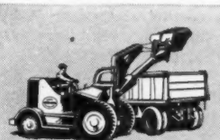
THE JAEGER MACHINE CO.

Main Office and Factory—Columbus, Ohio

REGIONAL OFFICES

8 E. 48th St. NEW YORK 17, N. Y. | 226 N. LaSalle St. CHICAGO 1, ILL. | 235-38 Martin Bldg. BIRMINGHAM 1, ALA.





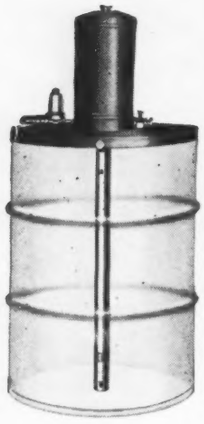
"FLEET-FOOT" Loaders

"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

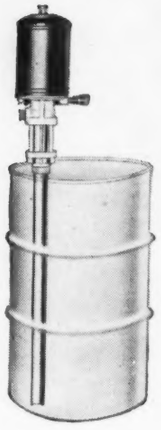


ALEMITE

No. 7701-B

Heavy Duty Barrel Pump

This pump can save you time and machines because it delivers fibrous, heavy or light lubricants direct from "barrel to bearing." Under the severest conditions, the performance of this ruggedly built pump is *guaranteed*. The exclusive Dyn-a-Matic Primer permits pumping of heavy fibrous lubricants even at low temperatures. What's more, the pump has the capacity to serve many outlets at the same time. It is made in high, low and medium pressure models. Suitable for lubrication of tractor rolls, idler bearings and all pressure gun fittings.



ALEMITE

No. 7710

Fast Delivery Oil Power Pump

A ruggedly built, heavy duty oil pump which pumps oil directly from 55-gal. drums. Used for rapid filling of crank cases or other housings requiring oil or fluid gear lubricants. To operate, simply connect air line to easily detachable air coupling. This pump can make big savings for you wherever a large volume of oil or fluid lubricant must be transferred quickly. It delivers 3½ gal., of S.A.E. No. 10 oil per minute using 100 lb. air pressure, developing 4½ times air pressure used. In every way, this is a fast, accurate dependable pump.

HERE'S NEW ALEMITE EQUIPMENT

to Replace Broken and Inadequate Pumps

WHERE you can, put old lubricating equipment back in service by replacing worn parts with genuine Alemite parts. But you'll save time and money by replacing broken down, worn out equipment with new Alemite equipment. With machines depending for their lives on proper lubrication, you can't take a chance on breakdowns. Look over your lubricating equipment now, and then talk with your jobber.

ALEMITE

First in Modern Lubrication

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EQUIPMENT • LUBRICANTS • MAINTENANCE • CONSULTATION • ENGINEERING

Another Product of STEWART WARNER

ALEMITE

No. 6679

High Pressure Volume Delivery Gun

Here is a really heavy-duty gun that can take abuse and still do a dependable lubrication job. Has 21-oz. capacity and will handle fibrous, heavy and light-bodied greases. The gun develops up to 5000 pounds pressure per sq. in. It is easily and quickly filled through a loader valve or by removing the cylinder head. It is spring primed. The extra long handle gives maximum leverage and operating ease. Used with hose or adapters for lubricating all kinds of pressure fittings.

ALEMITE

No. 6528

40-lb. Pneumatic Gun

The famous Alemite "rock crusher." A sturdy, hard-hitting heavy duty gun with amazing versatility. Operates on 90 to 150 lbs. air pressure. Handles heavy greases at 33 times pressure used. Exclusive helix arm and worm action assures positive priming and eliminates air pockets. Has three large wheels which facilitate moving about on rough floors. Comes with 10-ft. high pressure hose, control valve with hydraulic coupling and adapters for Pin Type and Push Type fittings.

Engineered for Punishment!

● Building heavy-duty Off-the-Road Tires under war conditions . . . to do the same jobs as pre-war tires . . . developed and *proved* a new method of tire engineering at General.

"Shock Absorber" construction, General named it, because tire casings built this way stop shock concentrations . . . distribute heavy service loads and stresses uniformly . . . preserve the tire carcass for longer *original* service . . . more *recap* service.

More than just engineering excellence . . . General Off-the-Road Tires give you Top-Quality . . . stemming from quality control that extends from their own rubber and cord mills through to the finished tire. Generals are the tires delivering the lowest cost tire performance today!

THE GENERAL TIRE & RUBBER CO.
Akron, Ohio

GENERAL DEEP CLEAT

GENERAL ROCK SPECIAL

The **GENERAL TIRE**

GENERAL *OFF-THE-ROAD* TIRES

YOU CAN PROFITABLY HANDLE *All these materials* WITH TOURNAPULLS

Shale To strip 3' of shale and 18' of clay from a 54-acre Alabama coal mine, contractor S. R. Batson Co. used 2 Super C Tournapulls. 15 heaped yards are loaded in 75 to 85 feet in one minute. Tournapulls travel up 150' of 10% grade and 250' of 6% grade on average 800' one-way haul. Production is 3,000-yards-and-over every 10 hours according to Mr. Batson, who states that, in two months of operation, they have had only two hours down time.

Mud 3 Tournapulls moved mud during "shut-down" conditions for Grantwood Const. Co. on 110,000-cu. yd. land leveling job near St. Louis, Mo. Springs seeping out of hillside kept water standing in the cut. Fill was placed in a swamp. Tournapulls kept working because their big 21.00 x 24 tires gave ample flotation to stay on top of soft ground; correct ratio of weight to h.p., plus 2-wheel prime mover design, gave [illegible] and power.

Rooted Rock 5 Tournapulls loaded tight, rocky hardpan for Leonard & Slate on 2½-mile, 636,000-yard section of U.S. 99 north of Woodland, Wash. Each rig averaged 55 pay yards per hour on a 4600' round trip haul over 18 to 20% return grades, plus delays entering heavy traffic stream for haul on main highway. Tournapulls handle broken shale, decomposed granite, crushed stone, hardpan [illegible] material a Rooter can break loose.

Gravel Raemisch-Madden Co. used part of their fleet of 11 Tournapulls to load, haul and spread 47,000 cu. yds. of sub-base on U.S. 66, near Chenoa, Ill. Loading wet, pit-run gravel, hauling over pavement, spreading 4 to 6" lifts under rigid state engineer inspection, each rig delivered 25 pay yards per hour on 6-mile round trip. This method eliminated conventional shovel loading, truck hauling and spreader boxes.

Clay Working in typical Iowa gumbo, Peter Kiewit Sons Co. used 6 Tournapulls on their 2,300,000-yd. Rock Island rail relocation job, near Eldon, Iowa. Loading soft, sticky clay out of a 22' cut, material was spread on an 18' fill at bottom of a steep, slick grade. High apron lift, plus positive ejection tailgate cleared each load from the Carryall bowl; big-tired, 2-wheel traction gave plenty of pull through the soft fill and up slippery grade.

Sand "Nothing like Tournapulls to move this sand," says J. M. Jones, Sup't. of Claussen-Dunn Const. Co. on their 300,000-yd., 3-mile Georgia highway job. Material is loose, dead sand. Two Tournapulls pumped capacity loads up to the spring pipe in 2½ minutes; each rig averaged a 9000' round trip every 10 minutes, with travel through 7,800' of traffic on black-top. Rain kept other haul units out of pit for two days, didn't stop Tournapulls.

Investigate Tournapull profit possibilities on YOUR dirt-moving. Get cost and production estimates from your LeTourneau Distributor!

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 3700 Built and Shipped

TOURNAPULLS*

* Trade Mark Reg. U. S. Pat. Off.

FOR LOWEST NET COST PER YARD

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Made of wire rope to any length, size, and capacity, to meet your lifting needs.

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DREW Flat Braided Slings
MONARCH Standard Slings
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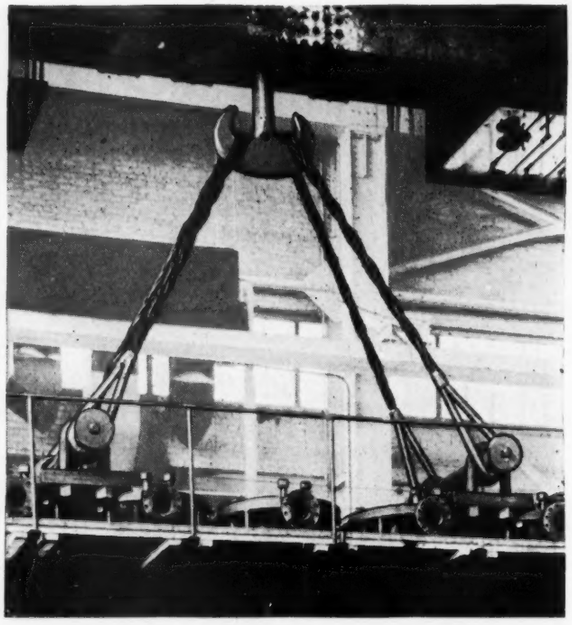
MULTIPLE-PART Slings

To make sure of maximum safety and economy, consult Macwhyte engineers. They will cooperate in designing the proper sling for your plant.



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Macwhyte Wire Rope Slings are made to meet the capacity of any crane built

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Raybestos Leads in Providing Dependable Friction Materials

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R-1-C (Raybestos Industrial Compressed). Medium friction value. Adaptable for friction and brake on internal or external applications. Closest to being all-purpose material for industrial use.

Raybestos leads in being a single, reliable source of correct and dependable friction materials for every make and model of equipment you operate.

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ON THE JOB

How much quicker, how much easier, how much cheaper it is to operate this way. A Homelite Portable Gasoline-Engine-Driven Generator with a power drill gives you mass production drilling on the job. The heaviest timber can be bored in position with no danger of holes misaligning. No waste of time. No waste of labor. No power trouble . . . for your Homelite gives you power when and where you need it.

If you want to see some of the many ways of using assembly line methods on a job with a Homelite Portable Generator just write for a free demonstration. We'll arrange to have a Homelite man go out to any one of your jobs and show what actually can be done.

Homelite Corporation

Portable

PUMPS • GENERATORS • BLOWERS

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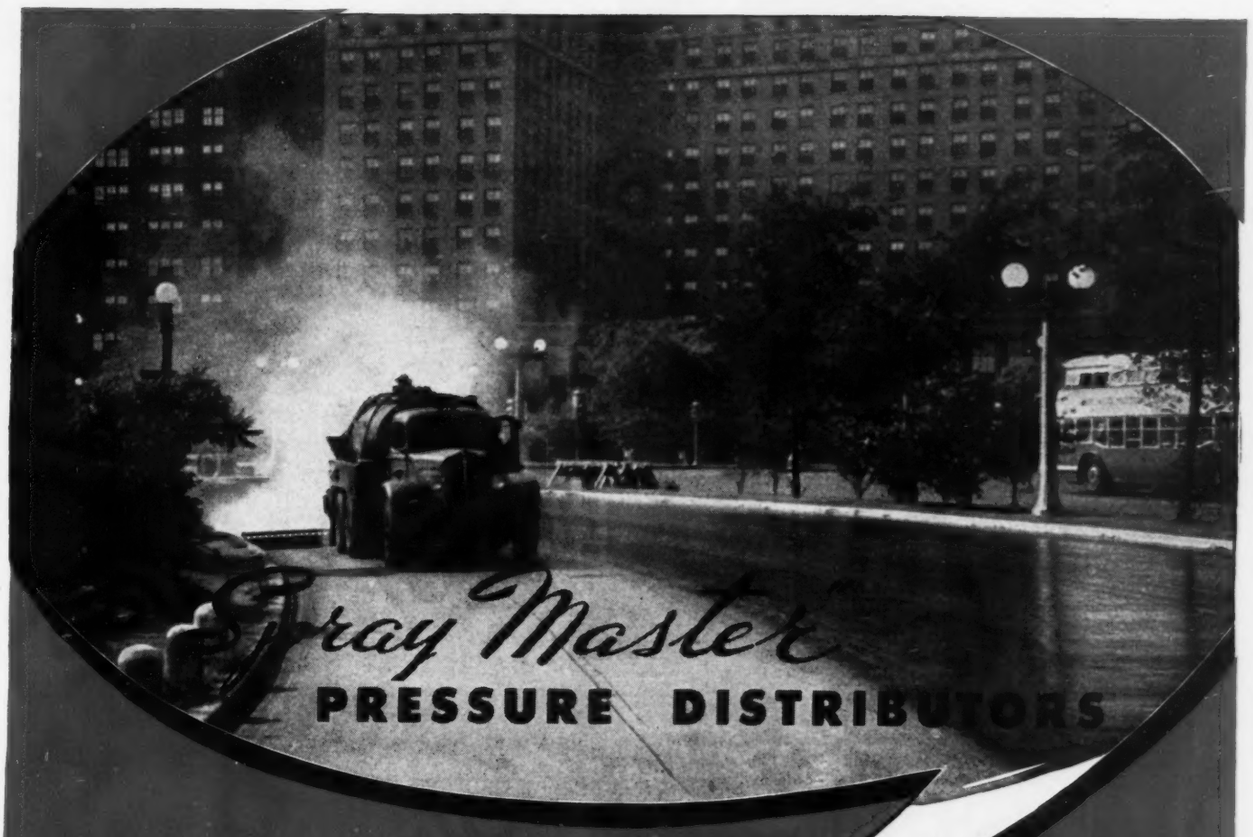
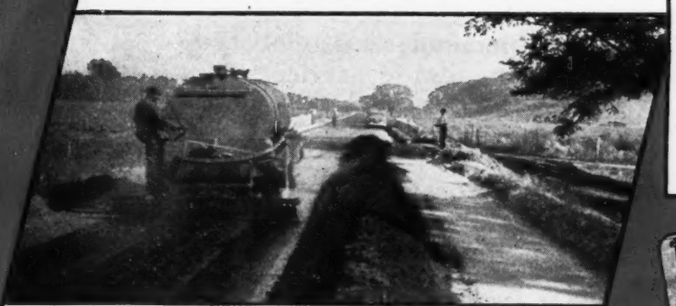


"Spray Master" spraying asphalt on an airport runway somewhere in the South Pacific.



A typical view of the "Spray Master" at work spraying a highway.

When it comes to spraying Asphalt, Tar, Road Oils, or Emulsions, the "Spray Master" cuts the cost of operation.

The "Spray Master" is not an ordinary Pressure Distributor, but a designed spraying unit that incorporates years of research and actual road work under all conditions. Features found on the "Spray Master" are exclusive Littleford design and are offered as standard equipment.

"Spray Master" Distributors are made in Front or Rear Engine Mountings with Standard or Circulating Spray Bars up to 24 feet in width.

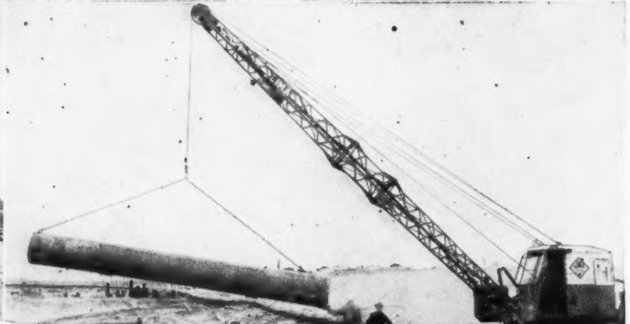
Be ready for the Big Road Building Program, have a "Spray Master" Pressure Distributor ready to do the job.

For the accurate application of Bitumen, Littleford offers to all users of Littleford Black Top Road Equipment a "Shot Guide" free. Write today.

LB BLACK TOP ROAD MAINTENANCE EQUIPMENT SINCE - 1900

LITTLEFORD

LITTLEFORD BROS., Inc.
465 E. Pearl St. Cincinnati 2, Ohio



SOME DAY YOU ARE GOING TO BUY A

When you buy your next 3/4 yard shovel, crane, dragline or pull-shovel you can make no better choice than a LIMA *PAYMASTER.* The *PAYMASTER* is relatively light in weight yet rugged enough to withstand the most severe conditions encountered in hard digging. It is equipped with an 18′ box type boom and 15′ tubular type dipper handle. When equipped as a shovel the *PAYMASTER* can easily be converted to a crane, dragline or pull-shovel or conversely without major dismantling. Such an advantage makes the *PAYMASTER* an efficient tool, adaptable to many kinds of work. A LIMA shovel, crane or dragline is identified by the Diamond on the cab. The LIMA Diamond is a symbol of 75 years of quality workmanship and dependable service.

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3/4 yd. Paymaster

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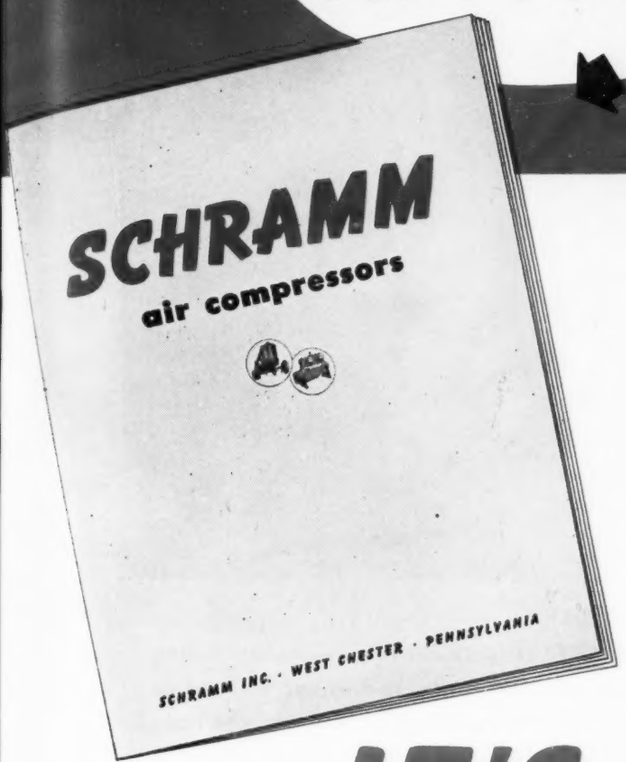
SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

AIR

as much as you need—

wherever . . . whenever you need it



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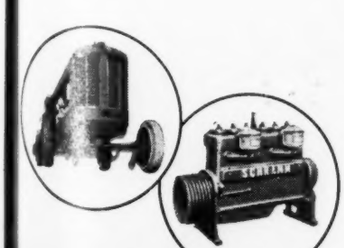

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
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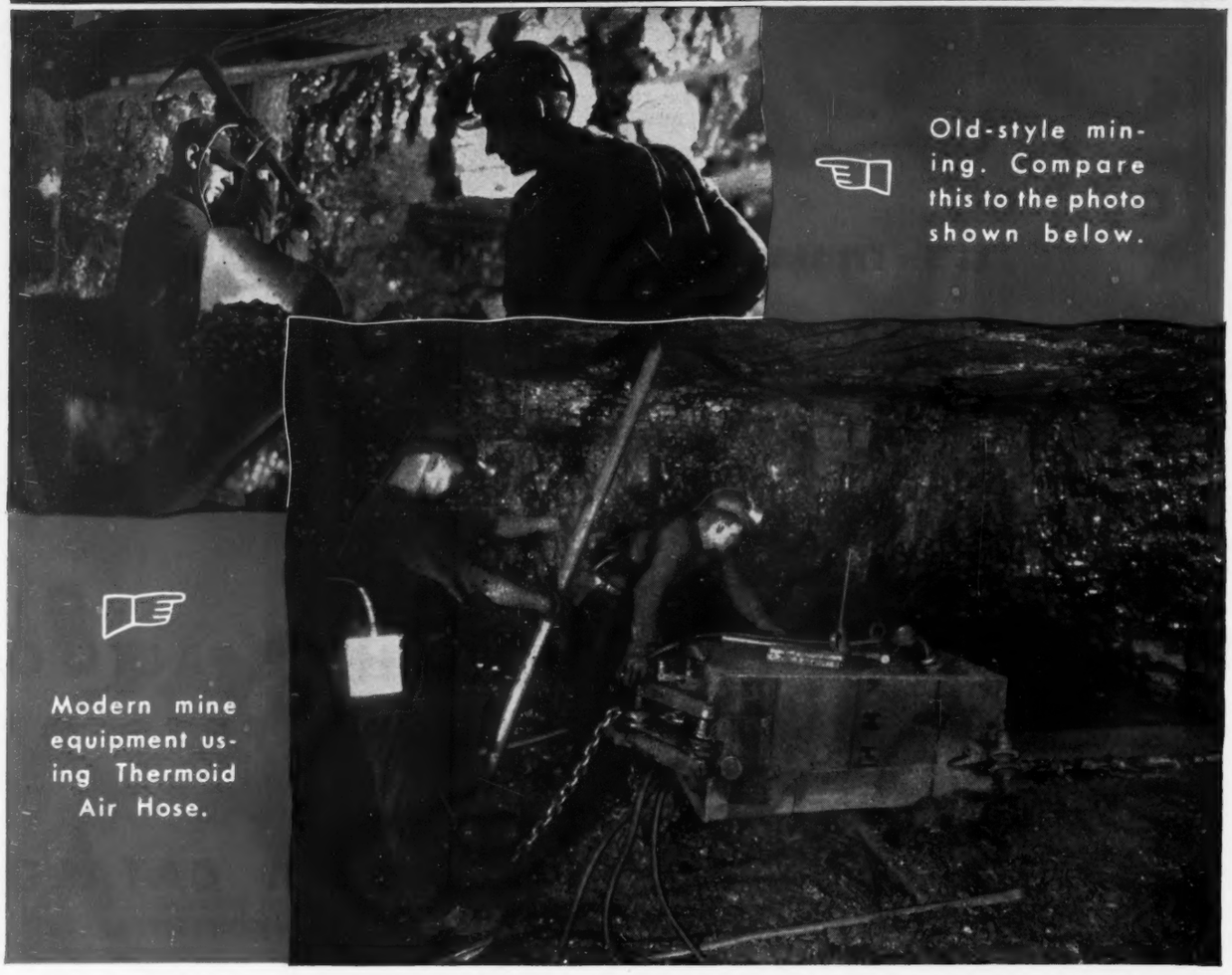
Thermoid —Key to Progress in Many American Industries



Old-style mining. Compare this to the photo shown below.

Modern mine equipment using Thermoid Air Hose.

SINCE 1880, Thermoid has contributed to the progress of American Industry. Through three wars, and the intervening periods of peace, Thermoid engineering, research and manufacturing facilities have been devoted to the production of longer life parts for coal mining.

Thermoid stands today in a position, unsurpassed by any competitor, to contribute to the post-war progress of your industry. The Thermoid Line* of belting and hose for materials handling and power transmission may contain the key to another step forward in the improvement of your process and the reduction of your costs.—"It's Good Business to Do Business With Thermoid."

***THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.**

Thermoid Rubber

DIVISION OF THERMOID COMPANY

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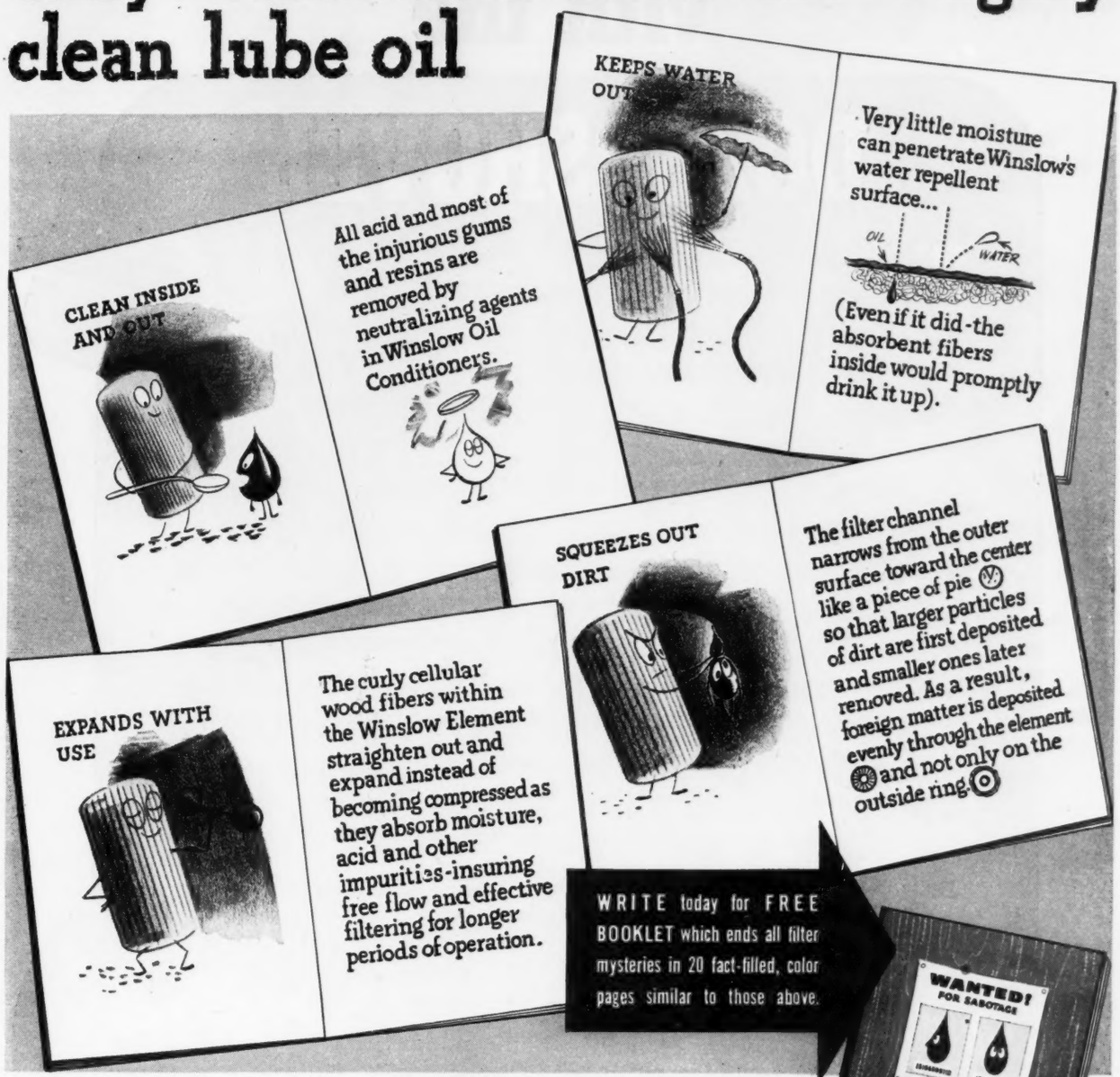
Contributor to Industrial Advancement Since 1880

Read the inside dope.... here's why Winslow filters thoroughly clean lube oil


CLEAN INSIDE AND OUT
All acid and most of the injurious gums and resins are removed by neutralizing agents in Winslow Oil Conditioners.
KEEPS WATER OUT
Very little moisture can penetrate Winslow's water repellent surface...
OIL
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(Even if it did - the absorbent fibers inside would promptly drink it up).
SQUEEZES OUT DIRT
The filter channel narrows from the outer surface toward the center like a piece of pie so that larger particles of dirt are first deposited and smaller ones later removed. As a result, foreign matter is deposited evenly through the element and not only on the outside ring.
EXPANDS WITH USE
The curly cellular wood fibers within the Winslow Element straighten out and expand instead of becoming compressed as they absorb moisture, acid and other impurities - insuring free flow and effective filtering for longer periods of operation.
WRITE today for FREE BOOKLET which ends all filter mysteries in 20 fact-filled, color pages similar to those above.
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The case of the dirty drip

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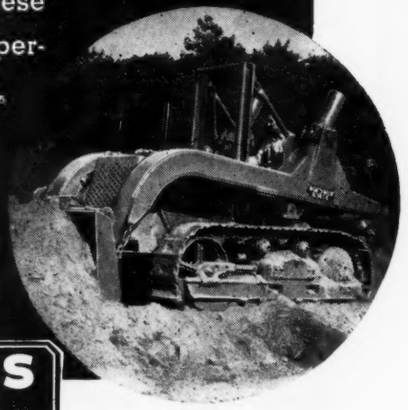
15T45



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And he's not backward about saying what he thinks about his power-packed prime mover, good or bad.

Find him where the tough, grubby jobs are getting done—on highway, airport and construction projects—at mill yards or with municipal crews. And listen!

Hear him tell what *his* International can do, how it pays off in lower costs on every job, how he can beat the other fellow with it in climbing, turning, digging, carrying and hauling.

And the outfit he works for backs him up with statements like this: *"It's a powerful tractor with all the speed and dependability we need. This is our first experience with International Power and we are thoroughly pleased with our choice." "Cheapest fuel cost and maintenance we have ever experienced."*

International Industrial Power Distributors have all information about International Diesel and carburetor-type TracTracTors, Wheel Tractors and Power Units. For help in selecting the size and type of power equipment that will serve you best, talk with the distributor near you.

Dependable after-sale service is provided all owners of Internationals by distributors and dealer organizations that span the continent and circle the globe. Factory replacement parts and equipment built for use with International Tractors and Power Units are available through these organizations. This assures maximum value and long term benefits for owners and operators everywhere.

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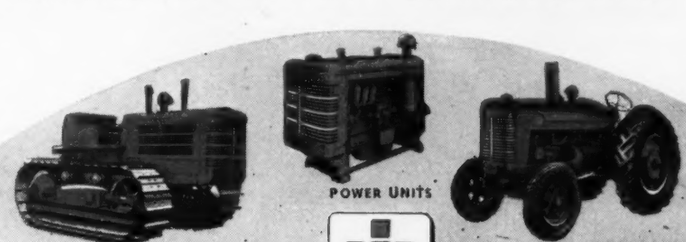
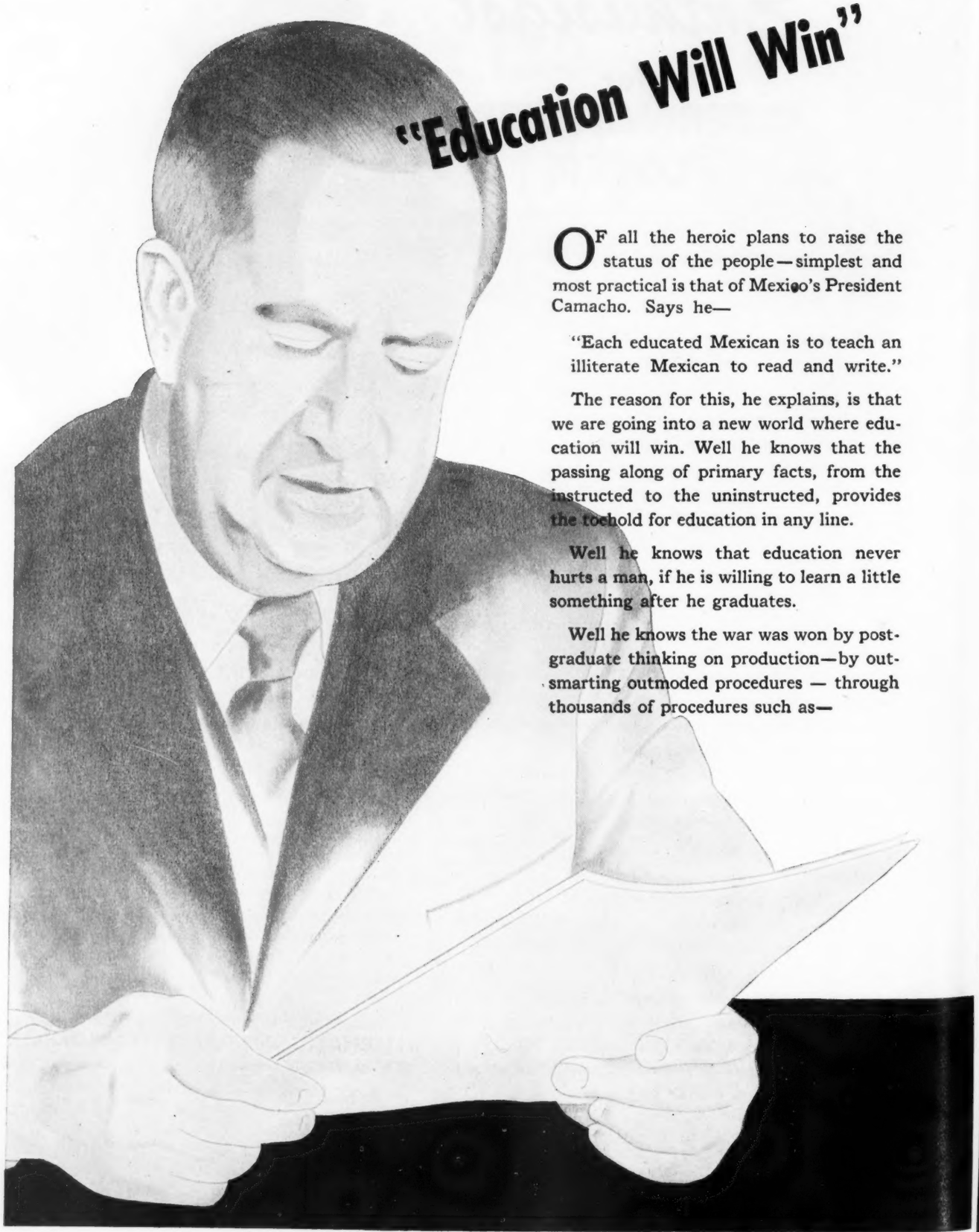


INTERNATIONAL INTERNATIONAL HARVESTER **Industrial Power**

then he said to himself:

"Education Will Win"



OF all the heroic plans to raise the status of the people—simplest and most practical is that of Mexico's President Camacho. Says he—

"Each educated Mexican is to teach an illiterate Mexican to read and write."

The reason for this, he explains, is that we are going into a new world where education will win. Well he knows that the passing along of primary facts, from the instructed to the uninstructed, provides the toehold for education in any line.

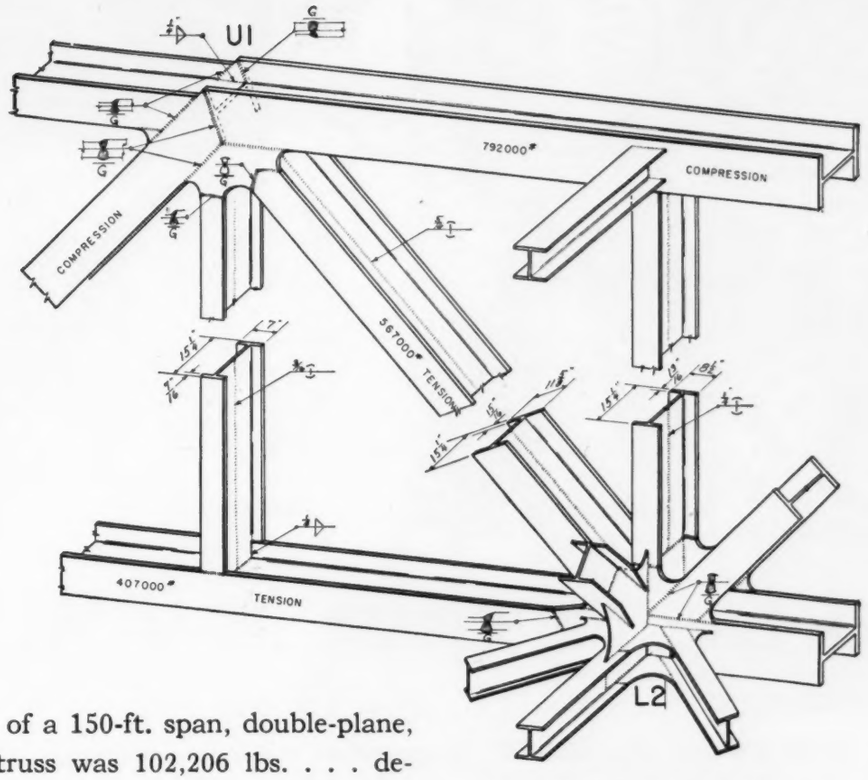
Well he knows that education never hurts a man, if he is willing to learn a little something after he graduates.

Well he knows the war was won by post-graduate thinking on production—by outsmarting outmoded procedures — through thousands of procedures such as—

"TEACH"... *he says*

HERE, PRESIDENT CAMACHO, is a source of education for any man interested in producing better structures at lower cost with Arc Welding:

HOW TO SAVE 21,806 LBS. IN TRUSS WEIGHT



Net weight of a 150-ft. span, double-plane, riveted jack truss was 102,206 lbs. . . . designed for an equivalent uniform load of 6,000 lbs. per linear foot. Designed for the same conditions and strength of arc welded construction, the truss weighs only 80,400 lbs. . . . saving 21.2% in truss weight.

The design and fabrication of this jack truss, *part of which* is shown above, are discussed in detail in Structural Studies 100 and 101. Free on request. Ask for these and future Studies on your business letterhead.

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America's greatest natural **recourse**

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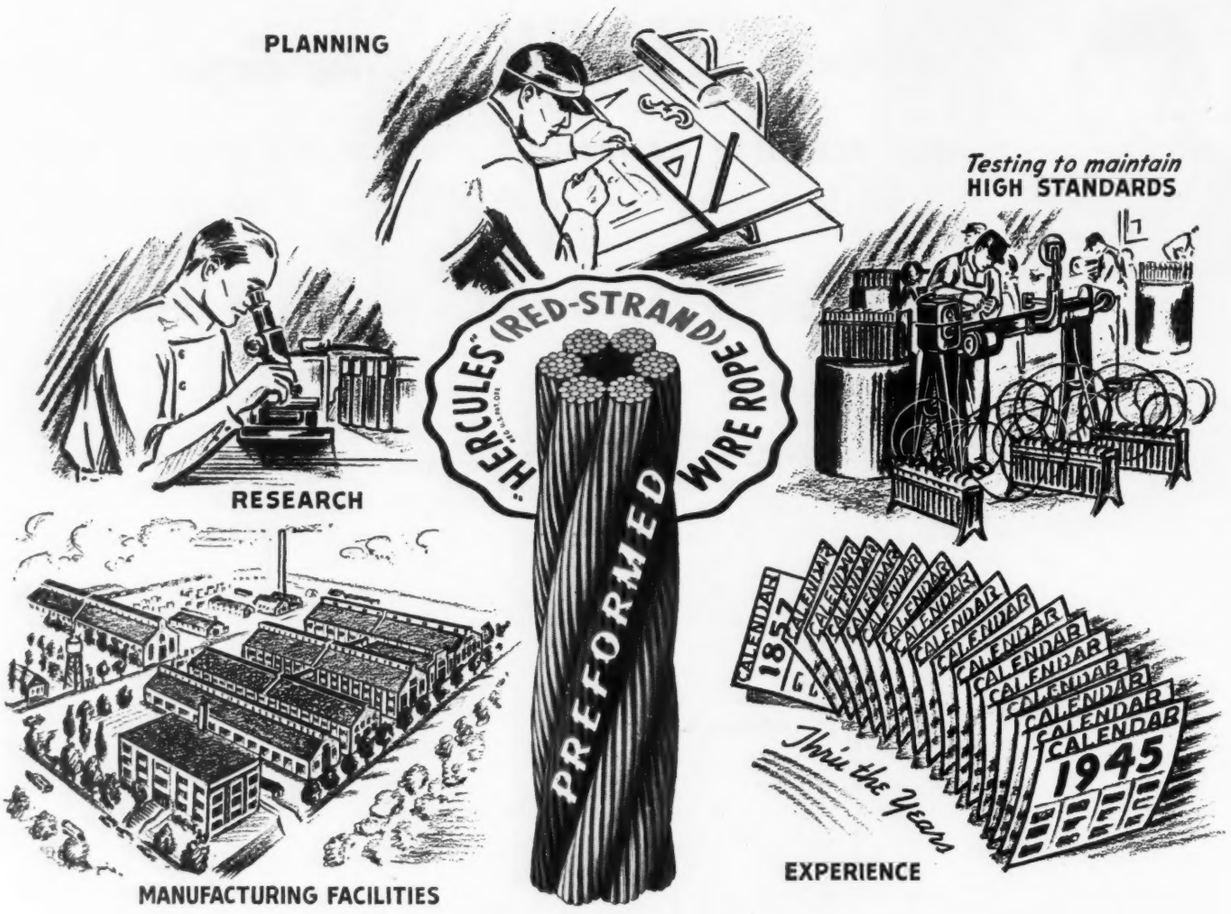

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The quality of "HERCULES" (Red-Strand) Wire Rope is never a matter of chance . . . it is the result of careful planning, diligent research, long experience, advance manufacturing facilities . . . *plus* high standards and the determination to maintain them.

As it is difficult to point out which is the most important leg of a three-legged stool, so it is hard to say which of these factors is the most vital . . . we know from experience that *all* are necessary. Proof of wire rope quality is in performance . . . find out for yourself just what "HERCULES" can do on your own job. Many who have made this test are now regular users.

Yes, there is a correct construction and type of "HERCULES" (Red-Strand) Wire rope to fit any job . . . anywhere.

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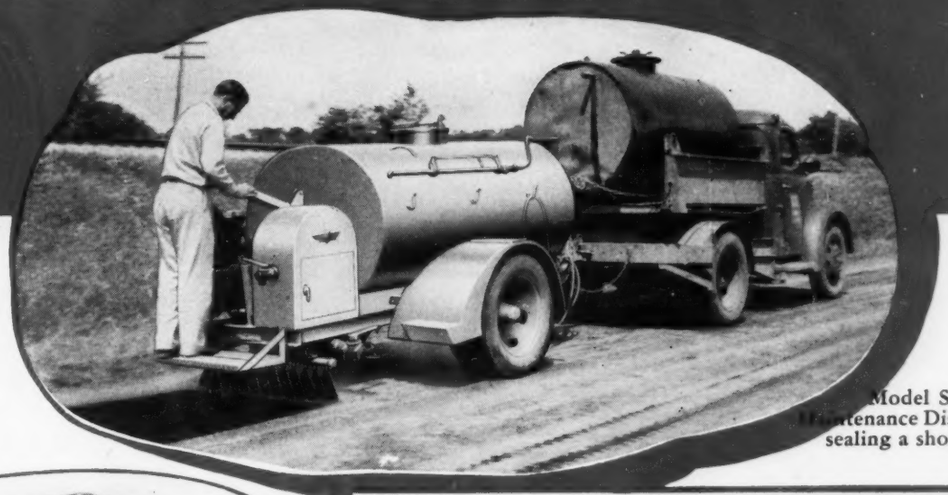
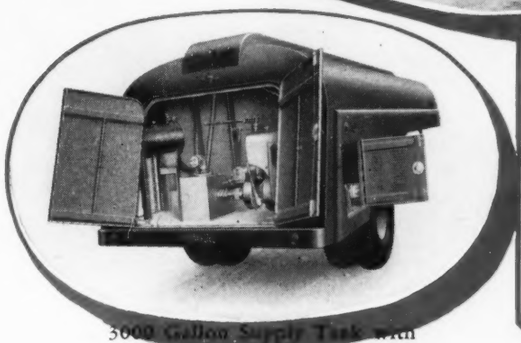
"HERCULES" (RED-STRAND) WIRE ROPE

ASPHALT EQUIPMENT

For Construction and Maintenance

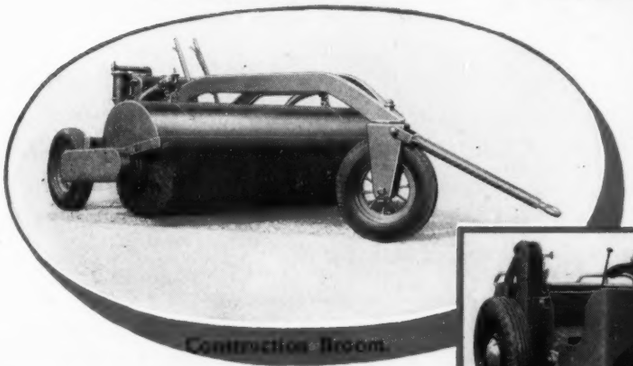


Model SJ Maintenance Distributor sealing a shoulder.



3000 Gallon Supply Tank with transfer pumping unit.

2500 Gallon Trailer Mounted, Model 424 Distributor.



Construction Broom.

Model 5 Tar Kettle with hand spray

1½ to 2½ Ton Patch Roller.

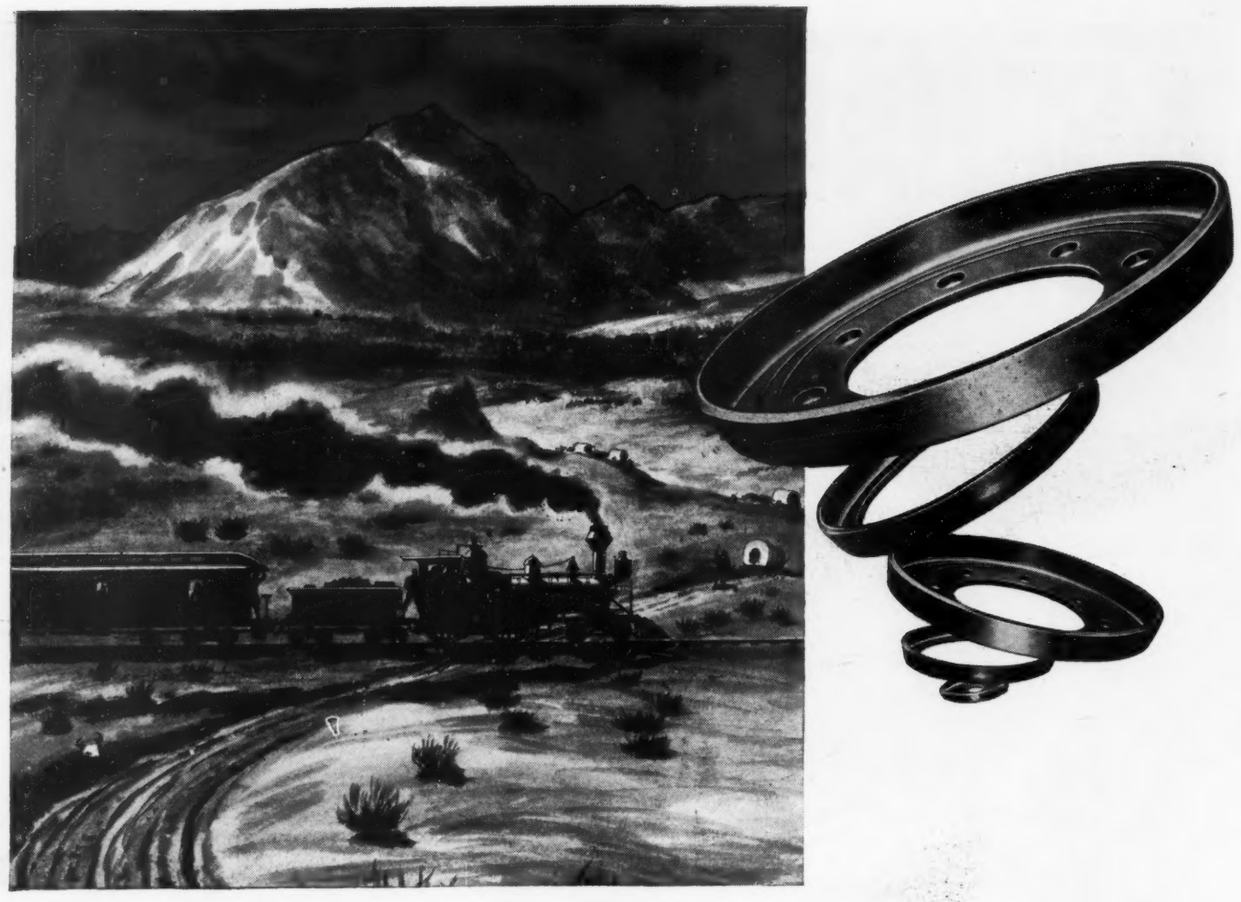
OTHER PRODUCTS

Asphalt Distributors, Tar Kettles, Maintenance Distributors, Burners, Spray Units, Street Flushers, Surface Heaters, Supply Tanks, Shoulder Rollers.

SALES OFFICES IN PRINCIPAL CITIES

Standard Steel Works

NORTH KANSAS CITY, MO., U.S.A.



PIONEERING that never stopped produced these better Piston Packing Cups

Covered wagons were still crossing the western plains when Westinghouse Air Brake Company started its pioneering in the field of pneumatic equipment. Today this same pioneering spirit is helping to open new frontiers for industry.

You'll find one evidence in Wabco packing cups for pneumatic and hydraulic cylinders. The material was developed in a long research program, aimed at producing a packing material that would retain resilience and sealing properties under alternate desert heat and winter cold, and that could "get along" with lubricants. Because of Wabco's remarkable service qualities, industry as well as railroads have put it to widespread use.

Wabco Piston Packing Cups are made in 363 sizes from ¾-inch to 30-inch for pneumatic cylinders, and from 1 3/16-inch to 7-inch for hydraulic cylinders. The limited compression feature is available in sizes from 1-inch to 7½-inch. If you use packing cups for original installation in your product, ask for Wabco Packing Bulletin.

WESTINGHOUSE AIR BRAKE COMPANY
INDUSTRIAL DIVISION

General Offices:
WILMERDING, PA.

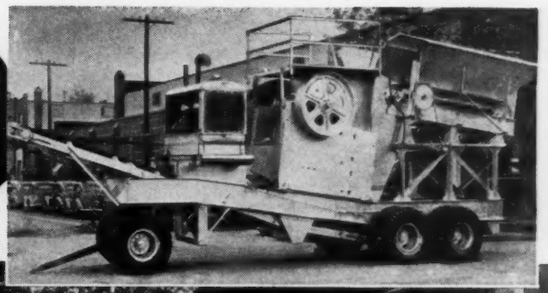
WABCO PACKING

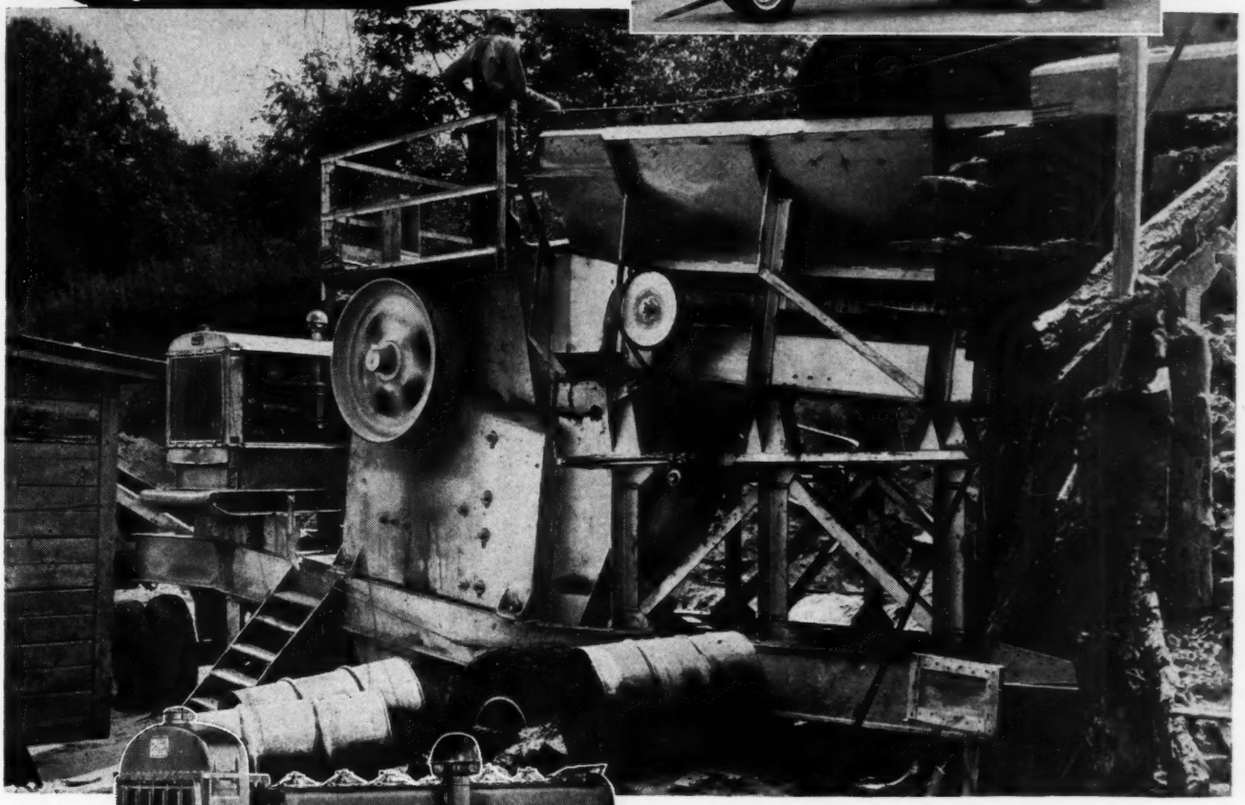
COMPRESSORS

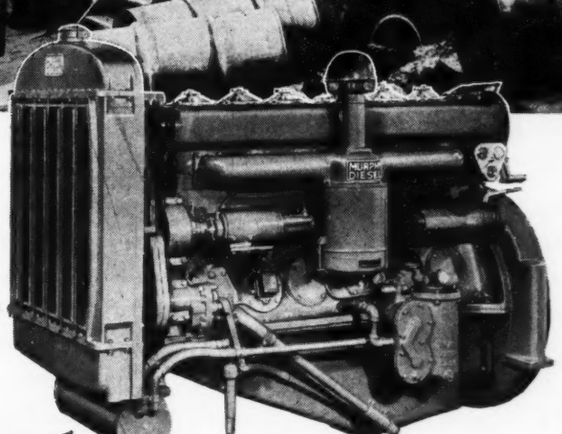
PNEUMATIC CONTROLS

K-3853

COMPACT...
for Heavy-Duty Mobile Equipment
...DEPENDABLE







Murphy Diesel ME-66 full Diesel engine, 6 x 6½", 6-cyl., 150 HP continuous, 180 HP intermittent.

THE closer a rock-crushing plant can operate to your source of rock, the better the opportunities for profit. The compactness, ruggedness, liberal reserve power and economy of MURPHY DIESELS make them the logical power unit for mobile or portable rock crushers . . . and for a wide range of other portable or stationary power plants, in single or multiple engine hook-ups, to meet any horsepower demands. Easy to start, economical to operate and maintain, rugged and long-enduring, MURPHY DIESELS offer broader opportunities for construction work profit. Write for bulletin.

MURPHY DIESEL COMPANY
5339 W. BURNHAM ST. • MILWAUKEE 4, WIS.

ARMY NAVY

★ Buy U. S. War Bonds ★

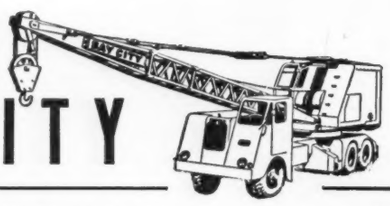
More Power
MURPHY DIESEL
Reg U.S. Pat Off.
More Profit

Engines: FROM 90 to 215 HP
Generators: FROM 60 to 115 KW

"FIELD-PROVEN Power"

107

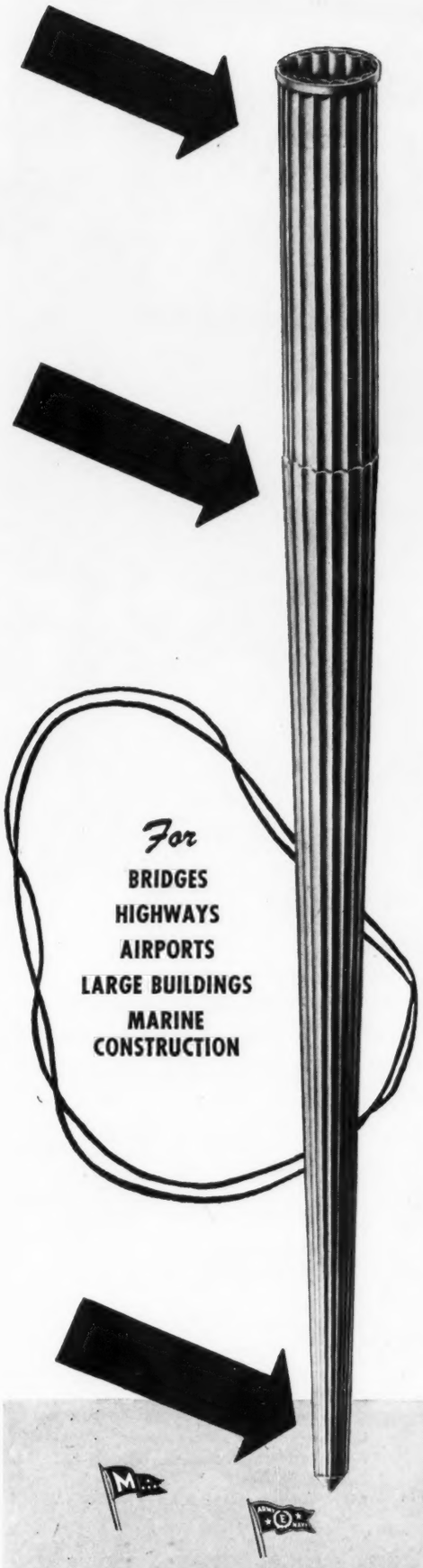
Talk about power and speed!—the BAY CITY Model 25 half-yard shovel, 5 ton crane, has plenty of both. One-piece chain crowd operates independent of hoist, hence utilizes full engine power. Bucket can be thrust beyond and above boom tip when necessary. Retract speed is twice crowd speed—capacity load is swiftly swung clear and dumped. BAY CITY Model 25 is the ideal sturdy, fast shovel for scores of jobs like road grading where it does a clean, quick job as illustrated above. Husky? Ruggedly built with unit-cast alloy steel lower carbody and revolving table. Tandem drums on separate shafts. Heavy duty differential drive. Fully convertible from shovel to crane, drag, hoe, or skimmer. For consistently greater yardage, put the BAY CITY Model 25 to work for you. Other BAY CITY cranes and shovels available in a wide range of sizes and models—both crawler and pneumatic tire mounted. Call your nearest BAY CITY dealer today or write directly to BAY CITY SHOVELS, INC., Bay City, Michigan.



BAY CITY

SHOVELS • DRAGLINES
CRANES • HOES • CLAMSHELLS

SEE YOUR NEAREST DEALER for Bay City excavating and material handling equipment in sizes from ⅜ to 1¼ yards having crane rating up to 20 tons. Both crawler and pneumatic tire mounting.



For
BRIDGES
HIGHWAYS
AIRPORTS
LARGE BUILDINGS
MARINE CONSTRUCTION

3

Points of advantage in

MONOTUBE

Fluted Steel Piles

Monotubes are tapered, fluted—You can drive them faster, at less cost, and with average job equipment.

Monotubes are easy to extend—Extendible Monotubes can be added in the field, even in low head room, quickly, simply, economically. You don't have to make extensive tests for lengths. You can keep "cut off" waste to a minimum.

Monotubes are hollow, tubular—You can inspect them easily, quickly, thoroughly—top to toe—prior to concreting.

Other Valuable Features:

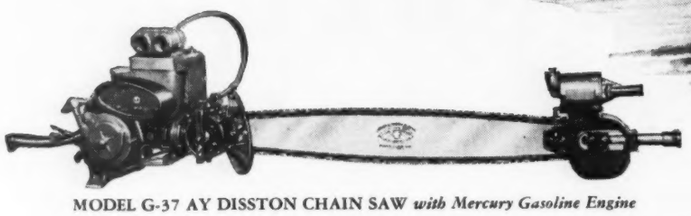
Monotubes are available in a gauge, size and taper to meet varying soil conditions. Their light weight makes them easy to handle, speeds work, cuts cost. For catalog and complete information, write The Union Metal Mfg. Co., Canton 5, Ohio.

UNION METAL

Monotube Tapered Piles

NEW "G-AY" MODEL *DISSTON* CHAIN SAW

WITH MERCURY GASOLINE ENGINE



MODEL G-37 AY DISSTON CHAIN SAW *with Mercury Gasoline Engine*

FIRST IN THE FIELD WITH NEW POSTWAR MODEL . . .

Yet this new model does not represent a sudden change. It is a result of long planning, plus continuous engineering research and development. And to these has been added exhaustive field testing in numerous applications including construction work of many kinds. All of the improvements combine to produce the most efficient chain saw ever made.

With the green light on for new construction, much of the contract work on your books can be started now. There will be much heavy timber to cut. Speed with economy may be essential. Both requirements will be met most successfully when you use this new time-and-cost-saving Disston Chain Saw. Write for particulars today.

ESTABLISHED 1840

REG. U.S. PAT. OFF.

DISSTON CHAIN SAW—*Pneumatic*
3½ h.p., 90 cu. ft. per min. 24" capacity. Wt. 45½ lbs.

OUTSTANDING NEW FEATURES

New "G-AY" Model

- Air Cleaner to keep sawdust and dirt from engine and carburetor.
- Fuel Filter (built in fuel tank).
- Die cast cooling fan.
- Die cast cylinder, with increased number of fins, providing greater cooling area.
- Reduction gear ratio of 3:1 — provides more efficient chain operating speed.
- Positive multiple disc clutch, 13 plates.
- Conveniently located throttle may be set in "open" position.
- Muffler prevents exhaust from annoying operator.
- Equipped with "L" pattern chains.
- Equipped with 3-rib protection cradle underneath engine.
- 3-7 H.P. Models; 5-11 H.P. Models—Capacities 24" to 84".

HENRY DISSTON & SONS, INC., 1148 Tacony, Philadelphia 35, Pa., U. S. A.

Tough jobs MADE EASY WITH FRUEHAUFS!

HERE are but a few examples of Fruehauf engineering — Trailers designed to handle *tough jobs* easier . . . and at the lowest possible operating cost.

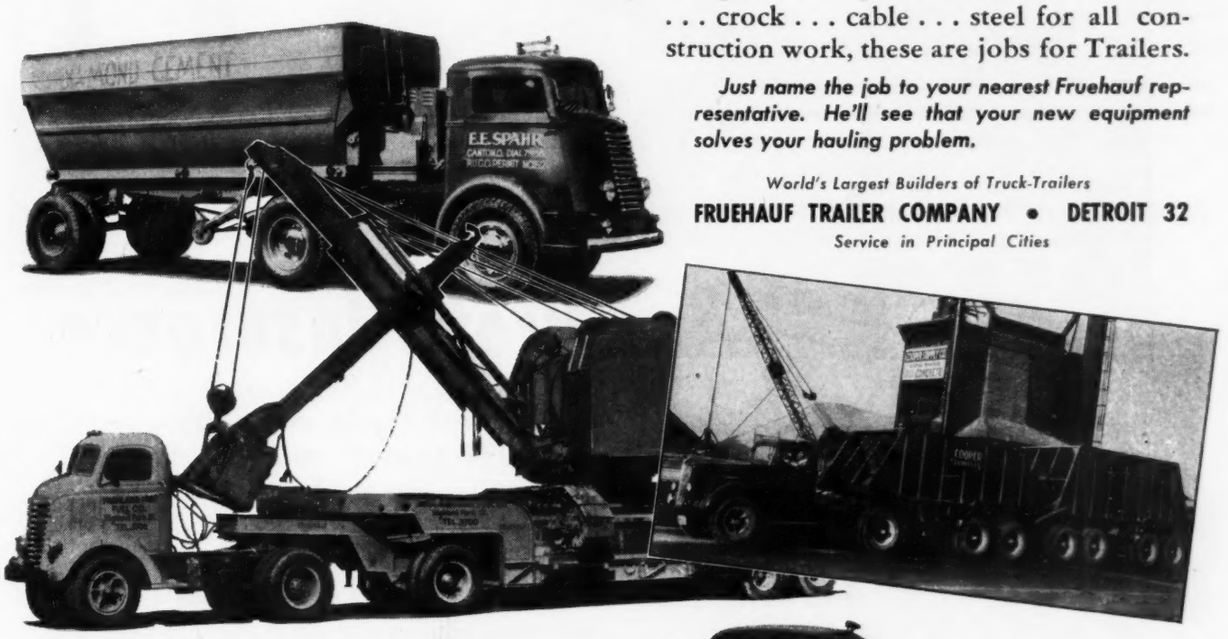
Hauling sand . . . stone . . . cement . . . heavy machinery . . . poles . . . power shovels . . . timber . . . crock . . . cable . . . steel for all construction work, these are jobs for Trailers.

Just name the job to your nearest Fruehauf representative. He'll see that your new equipment solves your hauling problem.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY • DETROIT 32

Service in Principal Cities



NATION-WIDE FACTORY-BRANCH TRAILER SERVICE

Over 50 Fruehauf Factory-Branch service stations are strategically located all over the nation. Keeping Trailers on the road is a fundamental Fruehauf policy.

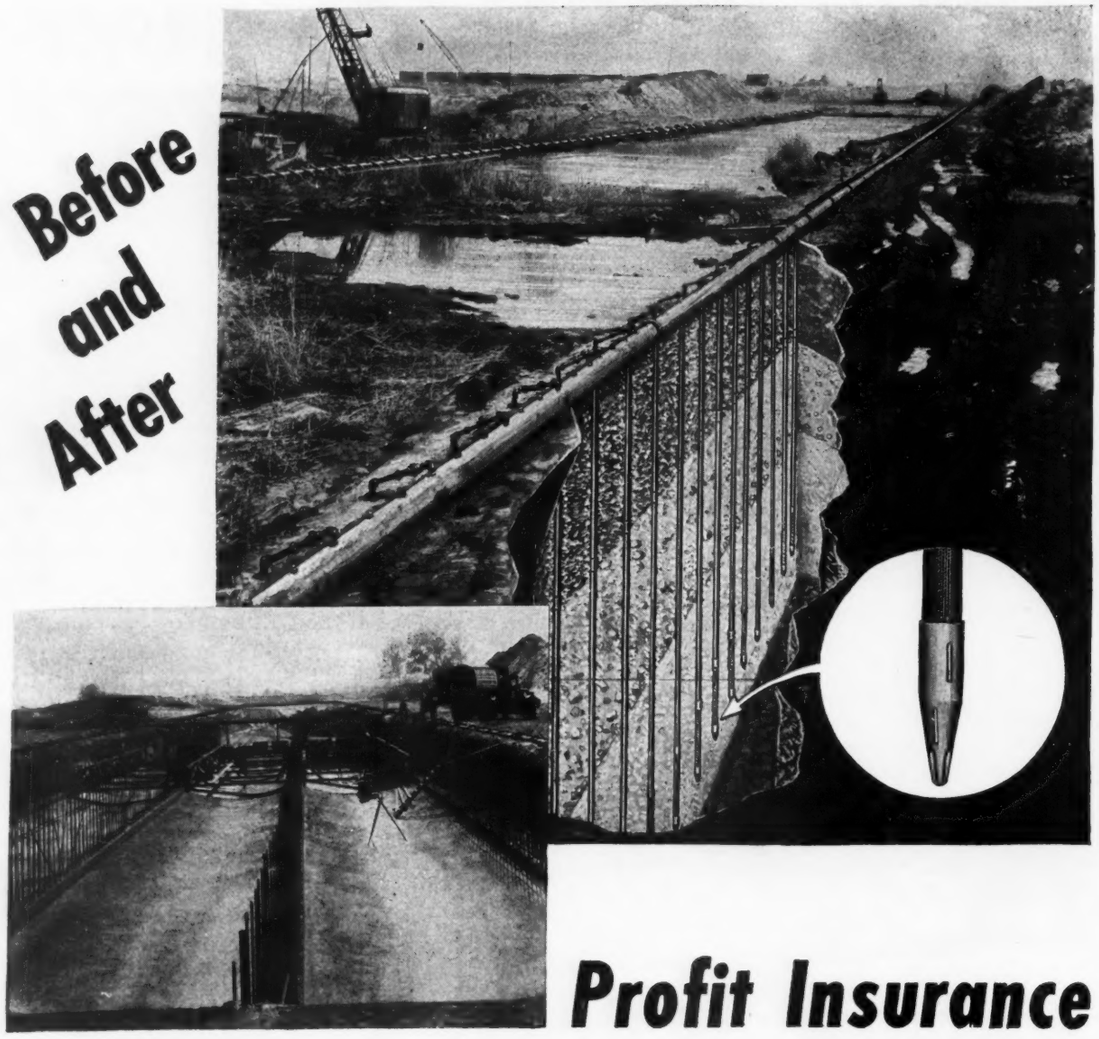
Fruehauf Trailers

Reg. U. S. Pat. Off.

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

"Engineered Transportation"

Before and After



Profit Insurance

Talk about your "before — and — after" photos! Here was the job of dewatering a waterlogged section 100 feet wide by 800 feet long, under water at high tide. Three Griffin Vac-U-Matic Pumps operating from ONE pump house, plus 300 Griffin Jet'n Wellpoints, did the work! Lower photo shows completed sewer invert in foreground, concrete being poured in central section. Fuel costs on a similar job nearby were 10 times in excess of the Griffin Diesel-powered Wellpoint Pump. No matter what you want to build — if the job needs dewatering, Griffin will do it for you fast! This is Griffin Profit Insurance.

GRIFFIN WELLPOINT CORPORATION

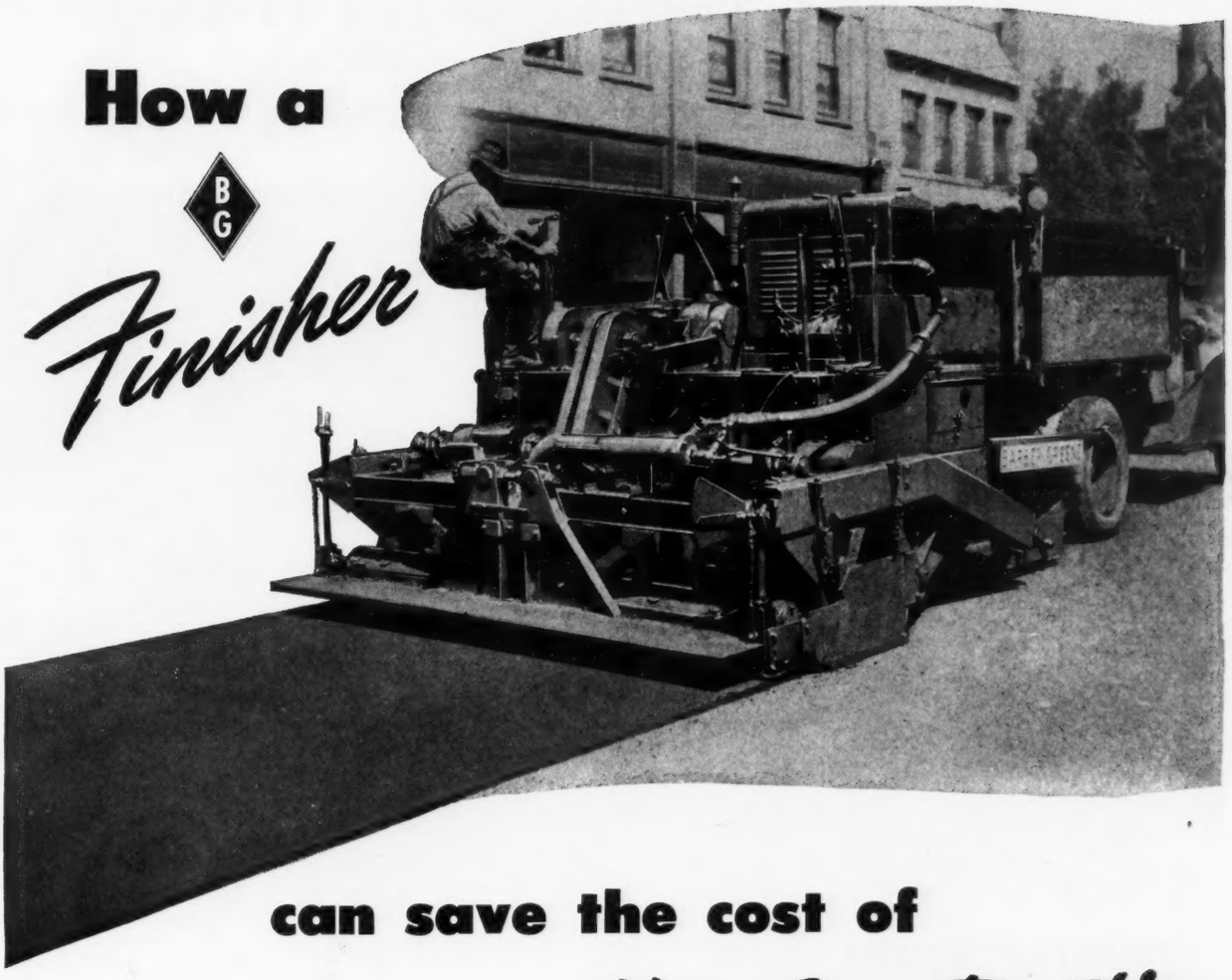
MAIN OFFICE: 881 East 141st Street, New York 54, N. Y.

Equipment Leased and Sold

MID-WEST
GRIFFIN EQUIPMENT CO., Inc.
548 Indiana Street, Hammond 1662
Hammond, Indiana

SOUTH
GRIFFIN ENGINEERING CORP.
2016 E. Adams St., Jacksonville 5-4516
Jacksonville 2, Fla.

How a B-G *Finisher*



can save the cost of *New Construction*

Here's the practical way to make the best use of an old base, and to give traffic-torn streets extra smoothness and extra years of wear.

The Barber-Greene *Tamping-Leveling* Finisher levels out uneven base surfaces . . . requires a minimum crew . . . handles all types of bituminous mix.

Traffic interruption is practically eliminated. The 10 to 12-foot lanes laid by the B-G Finisher are compacted by a special tamping bar . . . need minimum rolling . . . can be opened to travel almost immediately. And this crawler-mounted machine is sure-footed and compact for easy maneuvering in awkward corners.

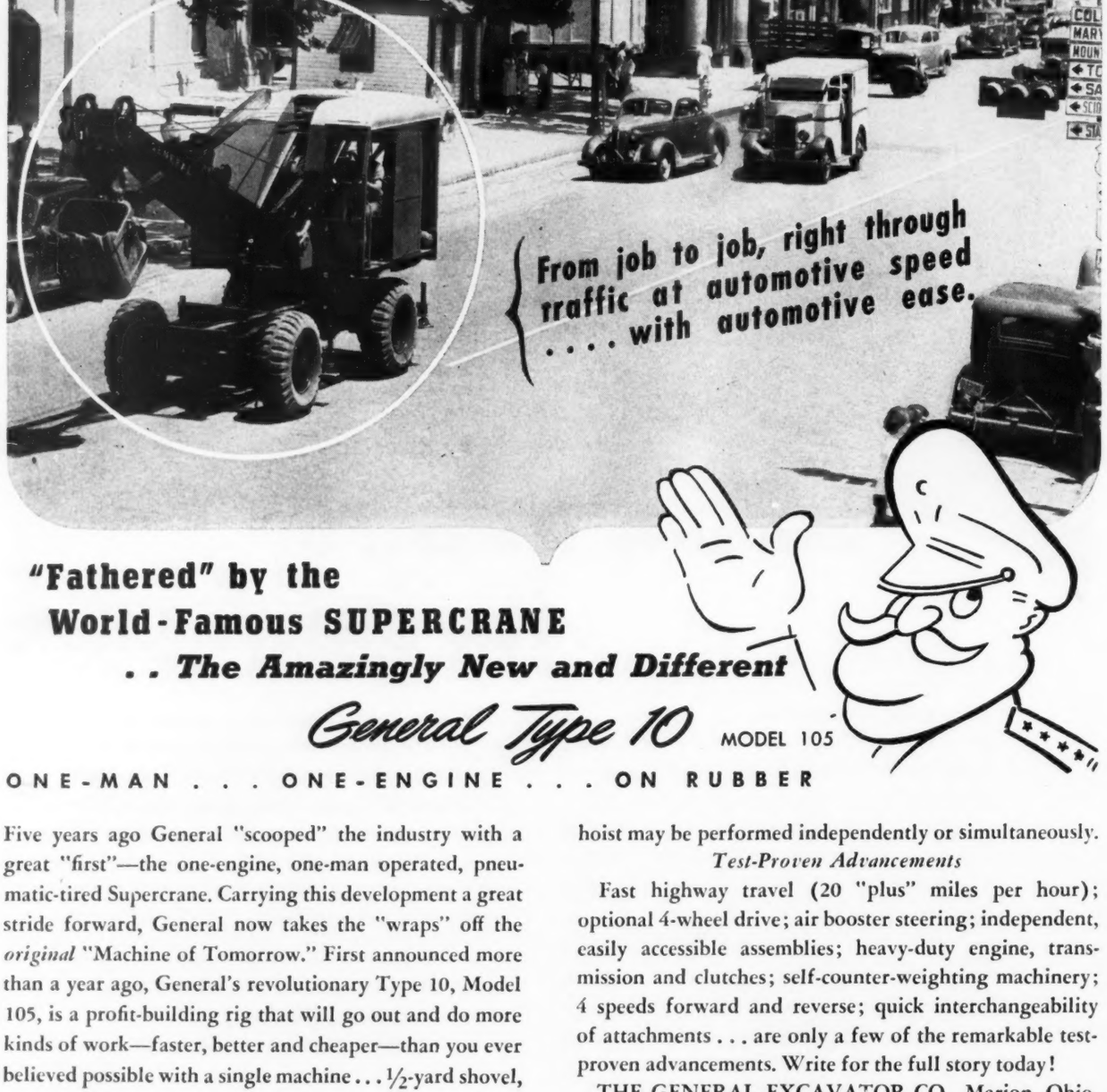
If extensive repair and road building programs need to be speeded up, investigate the many advantages of the B-G *Tamping-Leveling* Finisher that does two jobs at once. Our highway engineers will be happy to give you complete information and help in planning the construction of better asphalt highways. Barber-Greene Company, Aurora, Illinois.

45-17

Barber-Greene B G *Constant Flow Equipment*

"WRAPS" ARE OFF

The Latest and Greatest Development of a 5-Year-Old INDUSTRY "FIRST"



"Fathered" by the World-Famous SUPERCRANE

.. The Amazingly New and Different

General Type 10 MODEL 105

ONE-MAN . . . ONE-ENGINE . . . ON RUBBER

Five years ago General "scooped" the industry with a great "first"—the one-engine, one-man operated, pneumatic-tired Supercrane. Carrying this development a great stride forward, General now takes the "wraps" off the *original* "Machine of Tomorrow." First announced more than a year ago, General's revolutionary Type 10, Model 105, is a profit-building rig that will go out and do more kinds of work—faster, better and cheaper—than you ever believed possible with a single machine . . . ½-yard shovel, crane, backhoe, dragline, clamshell, magnet and piledriver "rolled into one" and rolling with automotive smoothness on a cushion of air.

Here is mobility you must see in action to appreciate. Here is easy, positive, instant-response, metered air control you can "feel" and guide with your fingers at all times. Here is a design so practical that swing, travel and boom hoist may be performed independently or simultaneously.

Test-Proven Advancements

Fast highway travel (20 "plus" miles per hour); optional 4-wheel drive; air booster steering; independent, easily accessible assemblies; heavy-duty engine, transmission and clutches; self-counter-weighting machinery; 4 speeds forward and reverse; quick interchangeability of attachments . . . are only a few of the remarkable test-proven advancements. Write for the full story today!

THE GENERAL EXCAVATOR CO., Marion, Ohio. Builders of the famous Supercranes and a complete line of shovels, draglines and related equipment; diesel, gas, electric—½ to ¾ yd.

GENERAL EXCAVATOR CO.

CRANES-SHOVELS MARION OHIO U.S.A. GENERAL DIESEL

A "Concrete" Case FOR Canvas

Canvas covers permit work to go on right through the winter—BUT, ordinary canvas is also a fire hazard. A hot rivet, a slip of a welding torch or a salamander left too close to a windbreak, and months of work and thousands of dollars may be lost.

It's an entirely different story when FIRE CHIEF-finished HOOPERWOOD Canvas is used because this canvas will not support combustion. The fire is out before it starts.

FIRE CHIEF has many other distinguishing qualities in addition to its fire resistance. It is also water, weather, wear and mildew resistant. It is flexible, year 'round, and it keeps its "dry" finish. The unique FIRE CHIEF treatment is permanent. It will not bleach or wash out. FIRE CHIEF may be stored for indefinite periods and still retain *all* of its inherent qualities.

Insist on FIRE CHIEF for your windbreaks and tarpaulins and be sure of protection and economy.

WM. E. HOOPER & SONS CO.
New York **PHILADELPHIA** Chicago
Mills: **WOODBERRY, BALTIMORE, MD.**

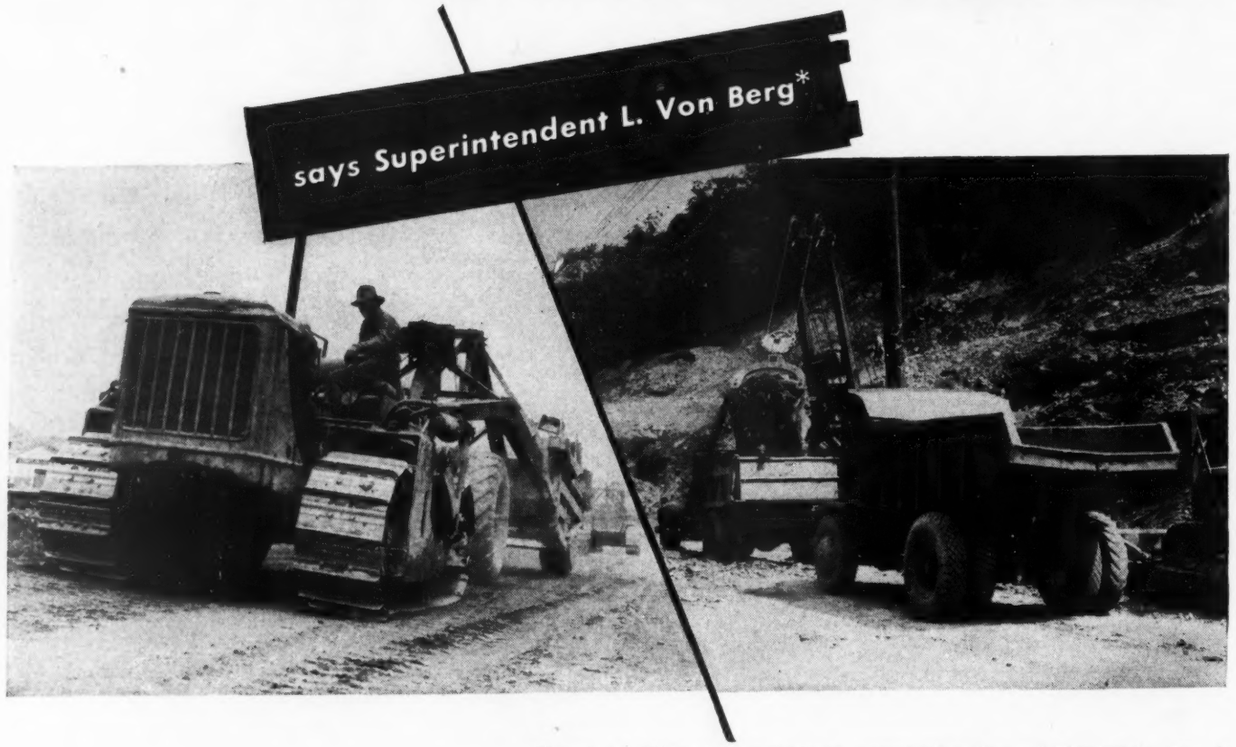
• Fire-Chief Finished (PATENTED) •

HOOPERWOOD COTTON DUCK

"GULF QUALITY PRODUCTS

HELP KEEP OUR EQUIPMENT AT TOP EFFICIENCY

—AND WE GET PROMPT DELIVERY SERVICE"



*Booth & Flinn Co., prominent contracting firm of Pittsburgh, Pa., is building a 2½-mile extension to the Ohio River Boulevard which will complete this important artery from Pittsburgh to Ambridge, Pa. This project is the forerunner of an extensive highway construcion program soon to get under way in Allegheny County, Pa. Booth & Flinn Co. report excellent performance from Gulf products, which help keep their modern equipment on the job and operating efficiently.

"Gulf quality lubricants and fuels help keep our equipment in top operating condition — and Gulf's prompt delivery contributes to fewer delays in servicing it," says Superintendent L. Von Berg. "We're satisfied that we get more workhours from every unit and lower maintenance costs by dealing with Gulf."

You get three important advantages when you use Gulf products: First, a trained Gulf Service Engineer helps you select the proper types and grades for each requirement. Second, you're sure of getting lubricants exactly suited to your equipment and to your operating conditions—for the Gulf line includes over 400 quality oils and greases. Third, Gulf's wide distribution through more than 1200 warehouses, located throughout 30 states from Maine to New Mexico, insures prompt delivery, no matter how remote the job.

Write, wire, or phone your nearest Gulf office today and arrange to use Gulf quality lubricants and fuels on your next job. They will help you complete it more quickly and at a larger profit.

GULF

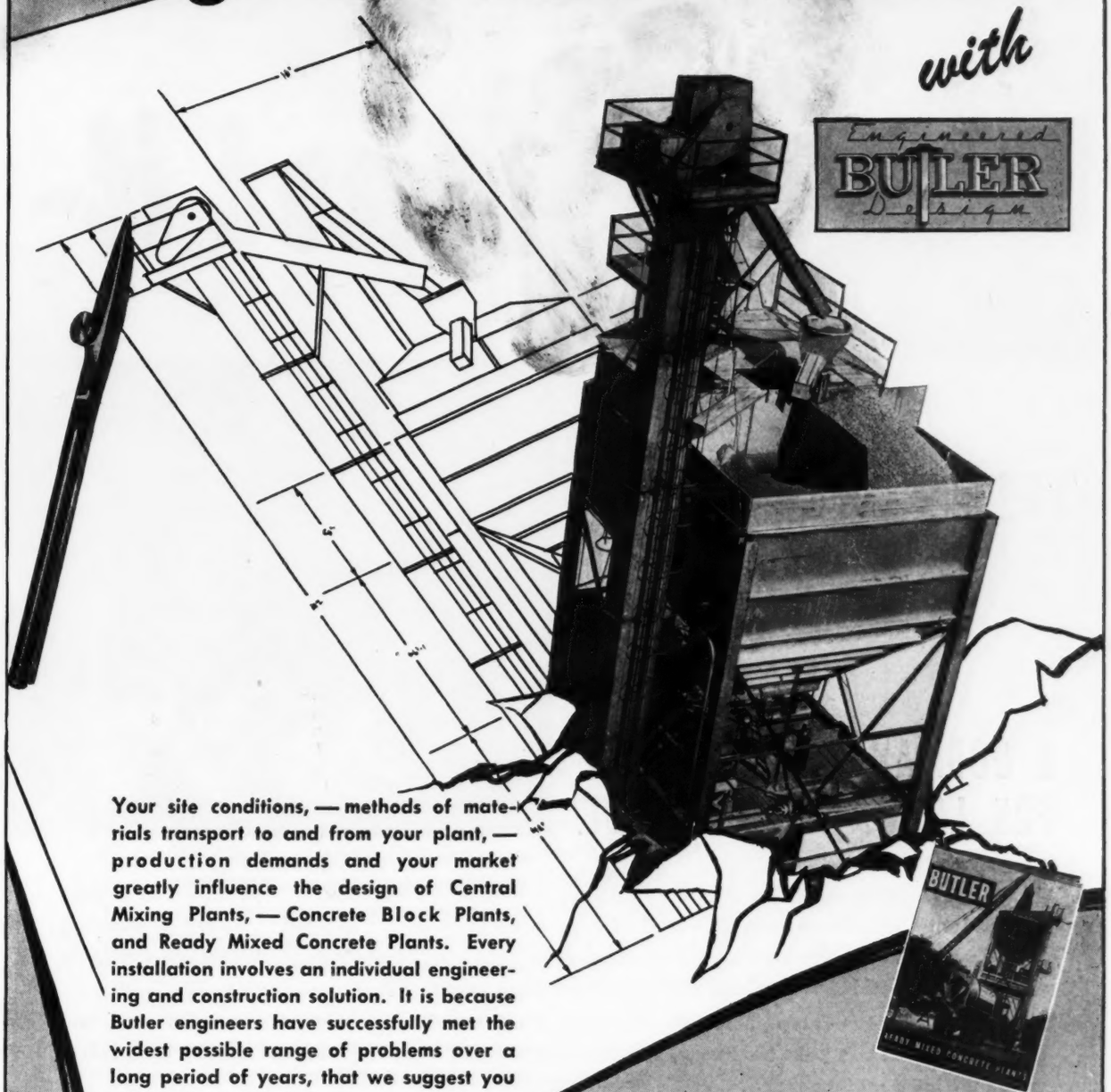
GULF OIL CORPORATION · GULF REFINING COMPANY

Division Sales Offices:
Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

Bring Your Plans To REALITY

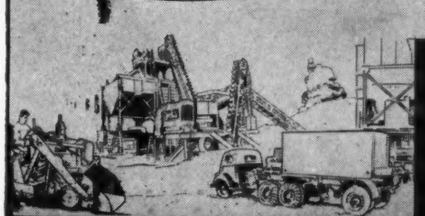
with

Engineered BUTLER Design

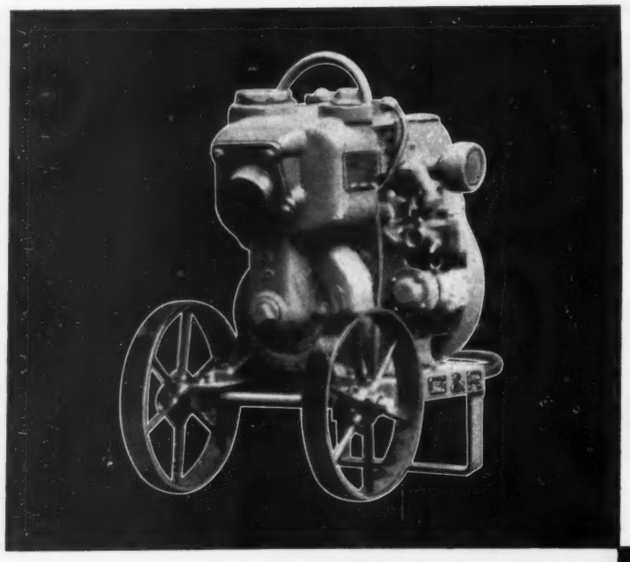


Your site conditions, — methods of materials transport to and from your plant, — production demands and your market greatly influence the design of Central Mixing Plants, — Concrete Block Plants, and Ready Mixed Concrete Plants. Every installation involves an individual engineering and construction solution. It is because Butler engineers have successfully met the widest possible range of problems over a long period of years, that we suggest you utilize their experience, — to assist you to bring your plans to reality with **BUTLER ENGINEERED DESIGN.**

Illustrated in this Butler Bulletin are a wide variety of Butler Central Mixing Plants, Ready Mixed Concrete Plants, Concrete Block Plants and other Equipment, typifying BUTLER ENGINEERED DESIGN. Send for your copy. Ask for Bulletin 185.

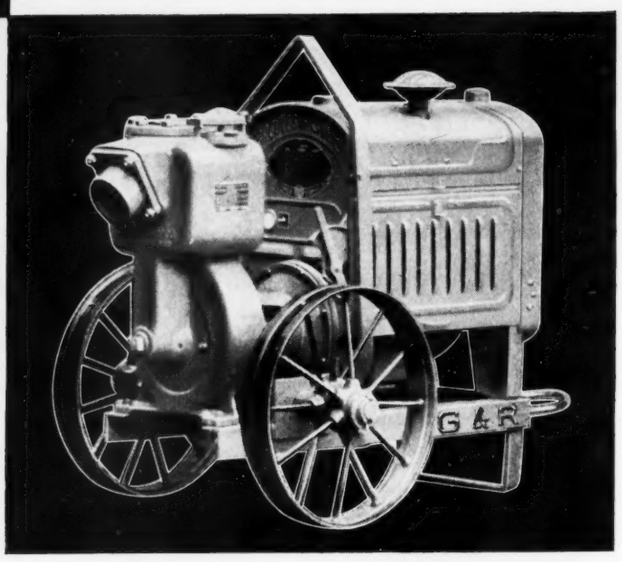


BUTLER
BIN COMPANY
WAUKESHA, WISCONSIN



Start it-

-THEN FORGET IT



A GORMAN-RUPP IS BUILT FOR LONG, HARD SERVICE

With no time off for rest or repairs, Gorman-Rupp self-priming centrifugal pumps have run months without let up at full capacity. This kind of brute strength is what you need in heavy de-watering jobs. They're built for this kind of service and they're delivering it every day! Models are available with ratings up to 125,000 gallons per hour at average heads.

Furthermore, Gorman-Rupp pumps aren't choosy. They will handle any muck, weeds, sand and solid matter that can pass the intake, without clogging and without accumulating any such refuse within the interior of the pump.

Gorman-Rupp pumps are full automatic self-priming. Start the engine and you start the water. No by-passes or valves are used for this operation. Therefore, no efficiency is lost in pumping.

These are the simplest centrifugal pumps built -- least subject to wear and easiest to maintain. They carry a money-back guarantee to give complete satisfaction. Your nearest Gorman-Rupp distributor will be glad to put one on your next job and let you see for yourself.

THE GORMAN-RUPP COMPANY

GORMAN-RUPP PUMPS — UNSURPASSED FOR PUMPING FAST

308 BOWMAN STREET • MANSFIELD, OHIO

makes your . . .

TOUGHEST jobs seem *EASY!*

● Rumbling irresistibly over the crest of a ridge comes this new and huskier Buckeye Dozer—ripping up stubborn stumps and boulders, rolling huge masses of earth before it, making short work of the hardest dozing jobs.

Heavy reinforced ribs on moldboard and pushplate maintain rigidity under the toughest dozing conditions. Rugged, but without excess weight, the moldboard can take the full power of the tractor on one corner without permanent deflection. The new Buckeye double trunnion mounting provides an improved method of adjusting the digging angle and tilting the moldboard to take advantage of every working condition, keeping the blade rigid at all times.

Investigate these cost cutting dozers. Write today for bulletins.

Built by **Buckeye**

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

Trenchers

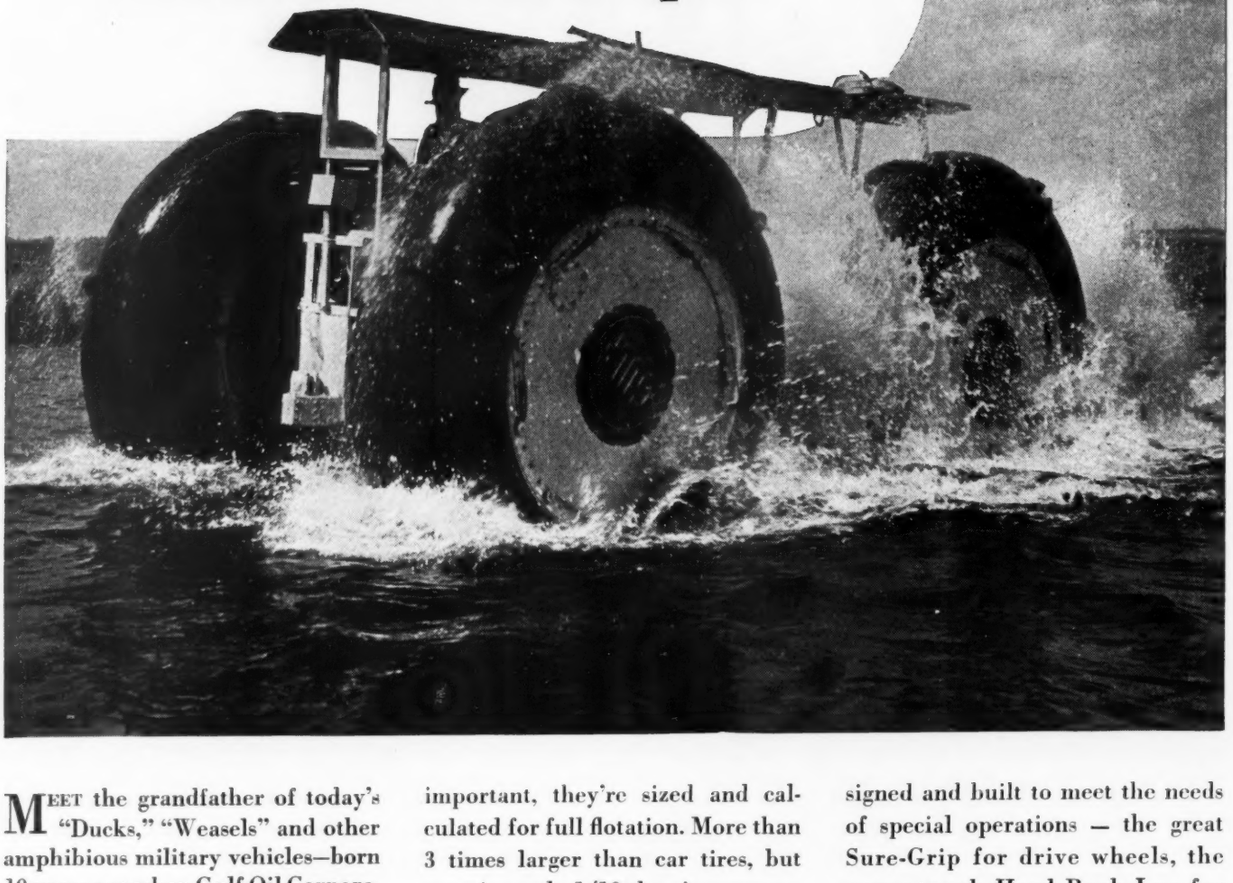
Tractor Equipment

Road Wideners

R-B Finegraders

Spreaders

Duck's Grandpa



MEET the grandfather of today's "Ducks," "Weasels" and other amphibious military vehicles—born 10 years ago when Gulf Oil Corporation geophysicists decided to search for oil deposits in Florida and Louisiana swamps.

To get men and test instruments into that soft, gooey marshland, Gulf engineers, with Goodyear development men assisting on the tire-and-wheel plans, designed the vehicle you see above — a self-powered "marsh buggy" shod with big Goodyear balloon tires cross-strapped with lengths of hose that act as traction chains in mud, as paddles in water.

These big Goodyears support and move full loads over dry land and marshland — keep the buggy from sinking into mud and ooze. Equally important, they're sized and calculated for full flotation. More than 3 times larger than car tires, but carrying only 1/10 the air pressure, these big babies are motive water wings, too—buoyant enough to float the buggy and its load when deep water is encountered.

This example of job-engineering adds further proof of Goodyear's ability to build the right tire for any job. For construction work, Goodyear off-the-road tires are designed and built to meet the needs of special operations — the great Sure-Grip for drive wheels, the super-tough Hard Rock Lug for rock work, and the time-proved All-Weather Earth-Mover for general purpose vehicles.

And because these 3 big Goodyears deliver top performance and lower costs-per-ton-mile, they're first choice with cost-wise contractors everywhere. Why not buy — and specify — Goodyears on *your* units?

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

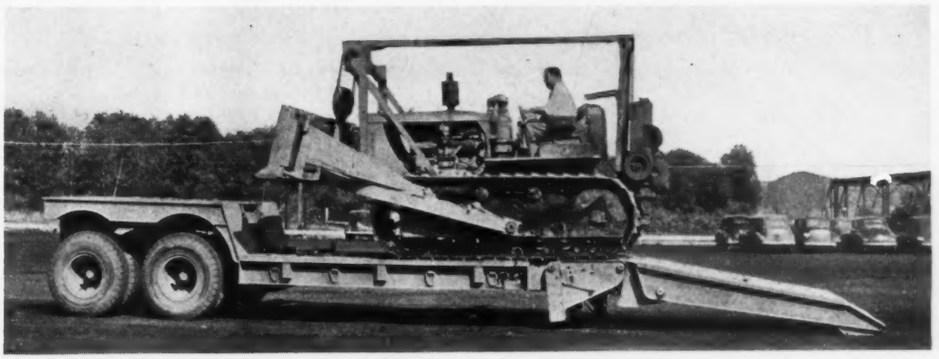
Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 27 | NOVEMBER, 1945 | Number 11

New Semitrailer Simplifies Equipment Transport



COLLAPSIBLE GOOSENECK OF SEMITRAILER forms ramp for quick loading of heavy construction equipment, eliminating necessity for carrying bulky, hard-to-handle, detachable ramp. End of trailer is supported by retractable jack operated by hydraulic hand pump.

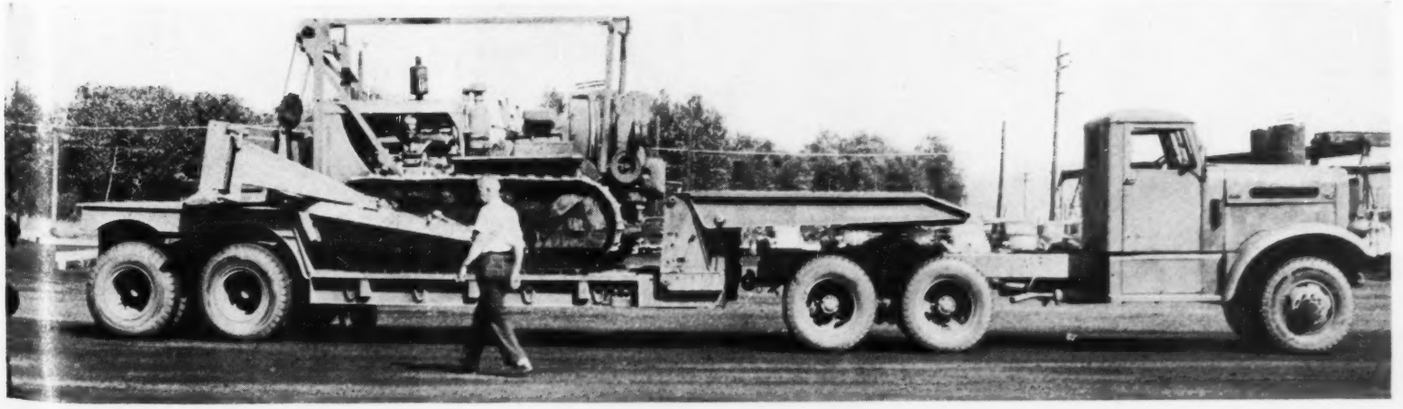
QUICK LOADING OF HEAVY CONSTRUCTION EQUIPMENT on to a low-bed semitrailer is provided by a collapsible gooseneck which serves as a full-width ramp. This feature, a development by the Corps of Engineers, permitted a further improvement, the use of large-diameter low-pressure tires which increase the usefulness of the trailer for off-road transport. High-pressure, small-diameter tires, necessary for trailers with rear loading facilities, are satisfactory for use on highways or fairly level hard ground but are practically immobile when used on very rough or soft terrain.

Operation of Ramp and Jack—When the trailer is disconnected from its tractor truck, latching pins are withdrawn and a valve which bypasses the hydraulic system fluid to the reservoir is opened to allow the gooseneck to collapse under its own weight.

A retractable jack, with a 670-sq.in. ground-bearing area, supports the end of the trailer when detached for loading. The jack is operated by two hydraulic cylinders (4⅜-in.-dia.

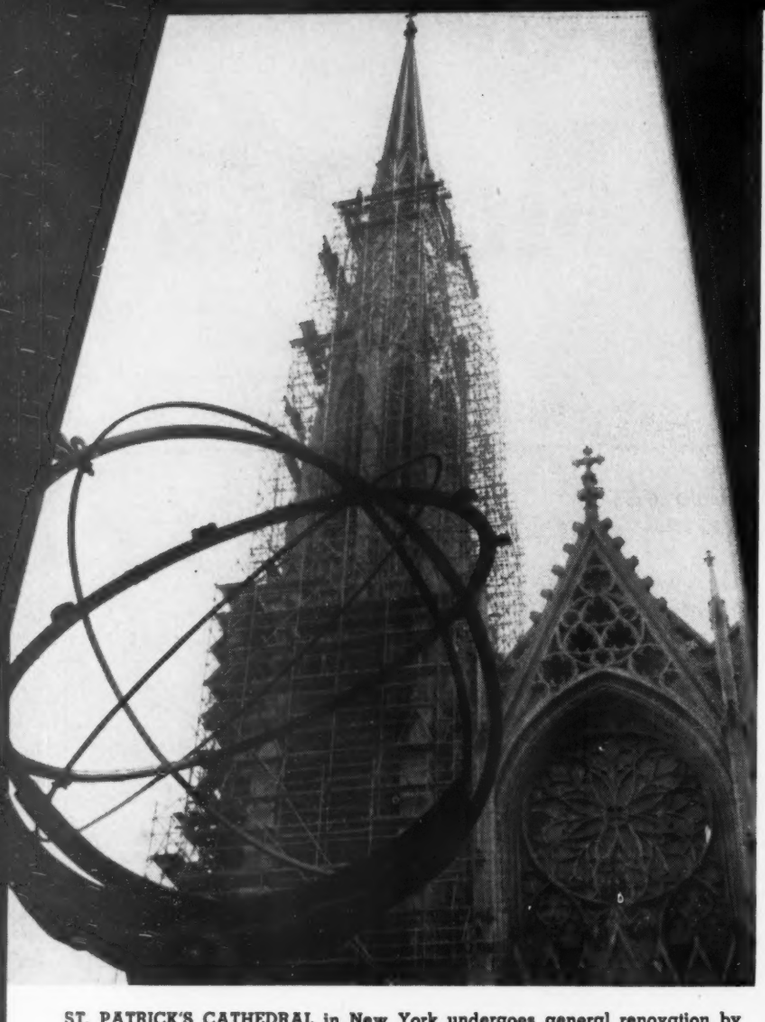
(Continued on page 180)

FLEXIBLE BOGIE and large-diameter, low-pressure tires permit operation of vehicle over uneven or soft terrain. Stability of trailer deck permits safe transport of loads with higher centers of gravity.



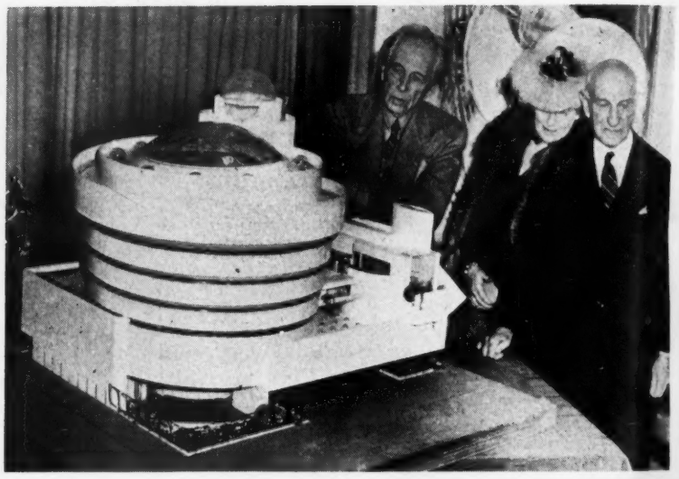
HYDRAULICALLY OPERATED GOOSENECK is returned to running position by hand pump and is automatically locked in place by two spring-loaded latching pins. Dozer blades on tractors or buckets on crawler shovels are supported on bogie platform. Recess in bogie kickup accommodates power control unit and drawbar hitch of tractors too long for 14½-ft. deck. Rated capacity of trailer is 40,000 lb.

THIS MONTH'S NEWS REEL



ST. PATRICK'S CATHEDRAL in New York undergoes general renovation by George A. Fuller Co., New York contractors. Scaffolding which rises almost to top of 330-ft. spire, seen through symbolic sphere on shoulders of Atlas in front of Rockefeller Center's International Building, was erected by Chesebro, Whitman Co.

Wide World Photo

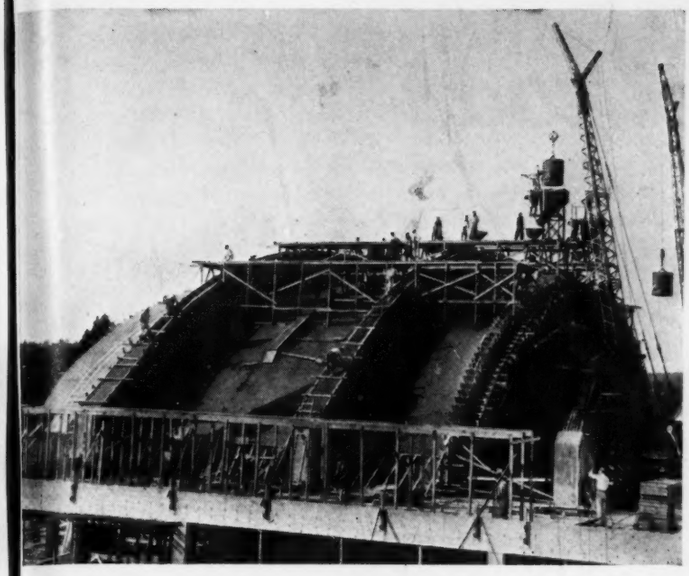


SPIRAL-SHAPED BUILDING costing $1,000,000 is proposed as art center to be built at 5th Ave. and 89th St. in New York by SOLOMON R. GUGGENHEIM (right), who inspects model of plastic monolithic building with FRANK LLOYD WRIGHT (left), architect, and BARONESS HILLA REBAY, director of proposed museum.

Press Association Photo

PERMANENT U. S. AIRBASES will be established at Marpi Point, Saipan (below, left), and on Okinawa (below, right) if recommendations of naval authorities that U. S. keep bases as permanent Pacific strongholds are accepted. Saipan field was originally Japanese airstrip and Seabees extended existing 3,500-ft. runway to 8,500 ft. New construction consisted of asphalt wearing surface on coral base. Coral was also used at Okinawa's Machinato airstrip and Engineers are shown here at work in coral pit.

Photos by Army Air Forces and Signal Corps



FLIGHT TEST LABORATORY is constructed at Schenectady, N. Y., County Airport, by General Electric Co. Built entirely of reinforced concrete, completed hangar will be 160 ft. wide, 175 ft. deep and 45 ft. high in center. Forms and scaffolding are mounted on wheels so they can be moved forward. Building will be used for testing jet and gas turbine engines, radar, aircraft instruments, and electronic aircraft equipment.

FIRST CUT ON FRIANT-KERN CANAL (below) is made by scraper attached to Caterpillar tractor, as first post-war Bureau of Reclamation project gets under way. Part of California's huge Central Valley Project, 160-mi. canal, is expected to be completed in 3 yr. at cost of $38,000,000. Peter Kiewit Sons, of San Francisco, has initial contract for first 5.6 mi.

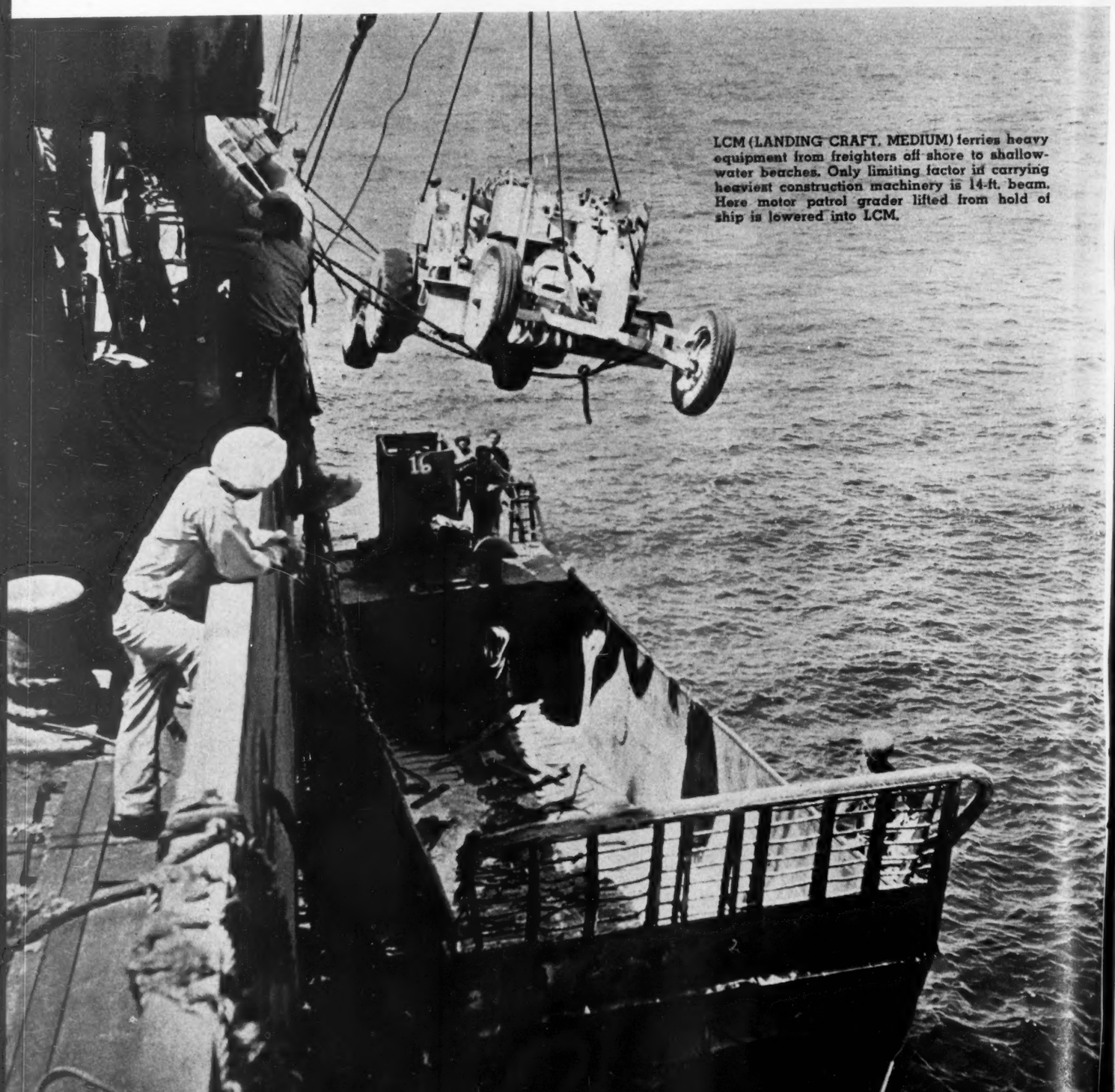
FRENCH SUPERHIGHWAY linking Paris, Brittany and Normandy is scheduled for completion next spring. To minimize traffic congestion near Paris, 400-yr.-old St. Cloud Bridge has been made over and 60-ft. wide tunnel cut through St. Cloud Hill. Cloverleaf intersection of six one-way lanes will keep converging traffic running smoothly near Versailles. French Press & Information Service Photo

TVA'S KENTUCKY DAM (below) is dedicated by PRESIDENT TRUMAN on Oct. 10. Among officials at dedication ceremonies are TVA CHAIRMAN DAVID E. LILIENTHAL (second from right, front row) and TVA DIRECTOR JAMES P. POPE (extreme right). Dam on Tennessee River near Paducah, Ky., can impound more than 4,000,000 acre-ft. of flood storage.

New Methods

Of Handling Construction Equipment Are Suggested by War Experience on Pacific Isles

By **COL. GEORGE E. WHITE,** Assistant Air Engineer, Headquarters Army Air Forces, Washington, D.C.



LCM (LANDING CRAFT, MEDIUM) ferries heavy equipment from freighters off shore to shallow-water beaches. Only limiting factor in carrying heaviest construction machinery is 14-ft. beam. Here motor patrol grader lifted from hold of ship is lowered into LCM.

GRADUATED FROM the U. S. Military Academy in 1936 Col. George E. White was assigned to the Corps of Engineers where in 1940 he became a member of the first Aviation Engineer unit. In April of 1941 he took the 804th Aviation Engineer Company to Hawaii. This unit, which was later expanded to battalion strength, built ferry routes through Canton and Christmas Islands. Under fire at Hickam Field when Pearl Harbor was attacked, it was one of the first units to go into action. Col. White subsequently became air engineer for the Central Pacific Area, serving as engineer of the Seventh Air Force. He supervised development of the Hawaiian Islands into a highly concentrated air base area and supervised the building of the air strip on Baker Island, 675 mi. east of Jap-held Tarawa. In October of 1944, after planning and directing construction of air bases in the Gilberts, Marshalls and Marianas, he became assistant air engineer, Headquarters, Army Air Forces.

SPARE TIRES LOADED ON 20-TON CRANE save cargo space in overseas shipment of heavy construction equipment. When possible, spare parts and tools accompany equipment to which they belong.

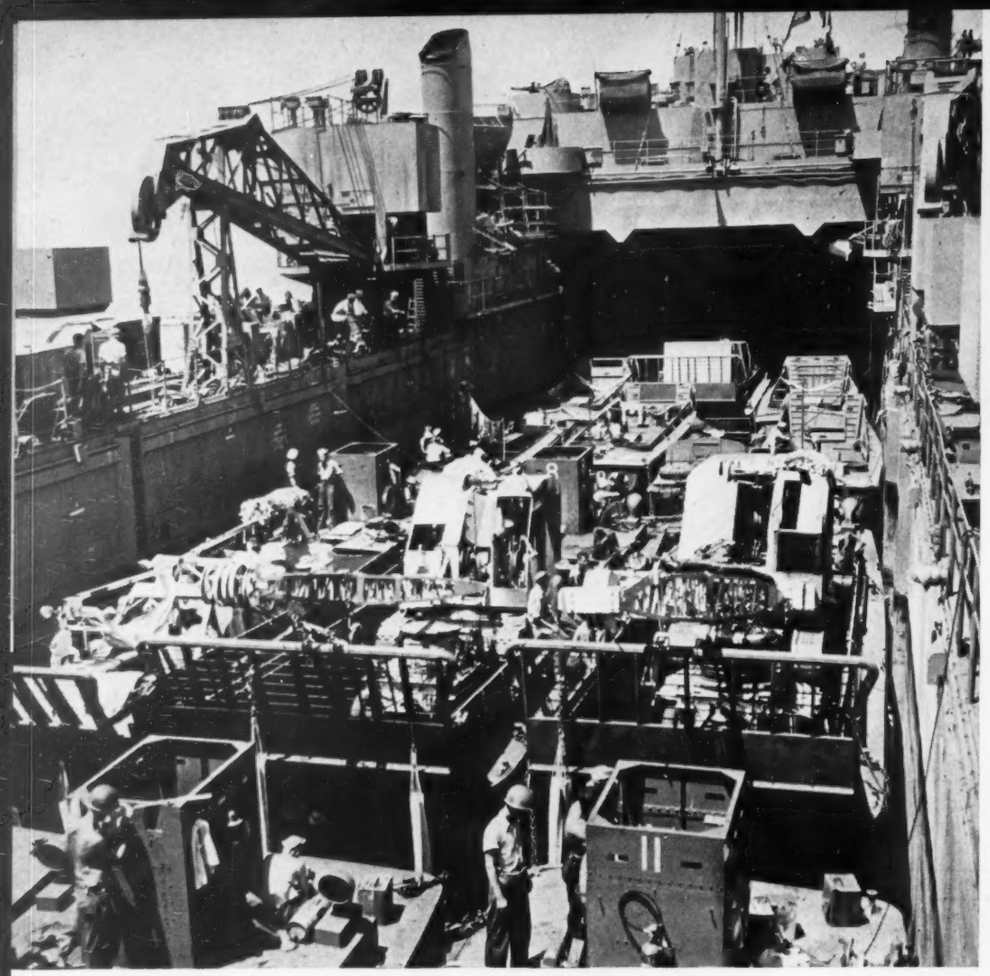
SUPPLIES AND EQUIPMENT LOADED IN TRUCKS are made secure by bands of box strapping to prevent damage during overseas shipment. Metal straps are drawn taut by ratchet wrench before crimping and sealing.

WITH THE END OF THE WAR, a vast new area is opened for development by engineers. This area includes the multitude of islands, large and small, stretching westward in the Pacific from Hawaii to the Philippines and northward to the newly conquered Ryukus. Although the final disposition of many of these islands is at present undecided, it is reasonable to expect that in many of them construction engineers and contractors will be called upon to repair the ravages of war and develop the military, commercial and industrial potential of these "never-never" lands. Although some development has been initiated by military engineers in the course of the war, demobilization will probably leave the large, long-range construction projects to civilian contractors.

In preparation for this job it would be well to note some of the lessons and techniques evolved during the war which

LOADED WITH SUPPLIES FOR OVERSEAS SHIPMENT, 2½-ton dump truck (below) descends ramp to lower deck of LST (landing ship, tank). Doors and ramp in bow permit unloading of mobile equipment under its own power.

WATERPROOFING OF D7 TRACTOR (below), for deep-water fording in ship-to-shore operation, includes adding of pipe extensions from vents, breathers and exhaust pipe. Before shipment, friction tape is applied to seams around air cleaner, spark plugs, magneto, generator and wire connections. Asbestos grease is applied to carburetor assembly and, as an added precaution against short circuiting, to spark plugs and wire connections.



OCEAN-GOING LSD (LANDING SHIP, DOCK) carries loaded LCM's to point near shore. Lowering of gate in bow of LSD permits discharge of smaller craft for final phase of trip.

HASTILY CONSTRUCTED PONTOON PIER composed of 5x5x7-ft. units provides facilities for un-

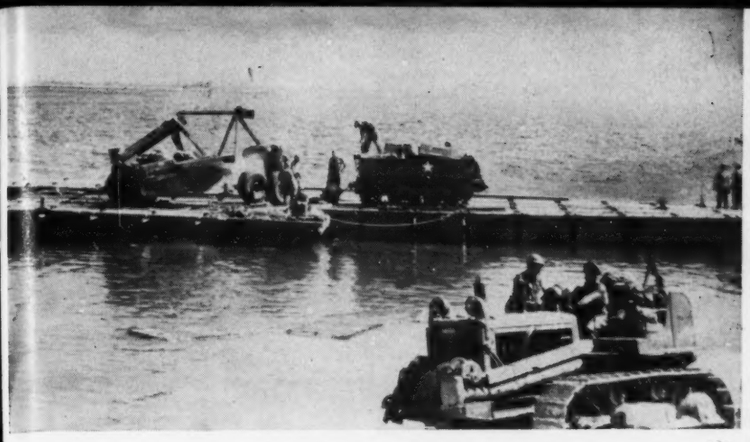
AMPHIBIOUS TRUCK NEGOTIATES SURF and soft beach to ferry personnel and light cargo from

may have direct application to post-war contracting operations. Unloading of heavy construction machinery on beaches a thousand miles out in the Pacific is a new problem to many engineers—and one which may be overlooked in the concentration upon the more obvious construction problems ahead. However, in planning such a job intelligently, the intimate relationship between the construction task and the logistical problem of effectively moving equipment to the site without waste of valuable time must be realized.

This relationship is especially important because of war-time developments in landing craft and unloading techniques. The contractor or engineer who does not know how to utilize these new methods will be at a decided disadvantage in coping with post-war construction jobs in the Pacific. While it is true that many of the new methods are especially designed to meet military requirements where speed rather than cost is the controlling factor, it is nevertheless beneficial to understand the inherent advantages of methods developed during the amphibious Engineer operations of the Pacific war. It is reasonable to expect that some or all of these developments will be at the disposal of contractors on overseas construction projects.

PROPER TYPES OF SLINGS AND SPREADERS (below) expedite unloading of equipment. Here fire truck is lowered over side of freighter into LCM for shallow-water beach landings.

GUY LINES ARE RUN TO SHORE from stern of LCM (below) to prevent broaching as craft is beached preparatory to lowering ramp and unloading ¾-yd. dragline crane under its own power.



loading Aviation Engineer equipment from LST during invasion of Kwajalein Island in Pacific.

STEEL MESH MATTING (right) provides temporary roadway across soft beach sand for heavy wheel loads of construction equipment and supply - laden trucks which otherwise bog down (below).

ship to shore. Amphibious tractor is also used for lightering or ferrying operations.

Undoubtedly the greatest single amphibious contribution to the engineer is the landing craft developed and built during the war. Although primarily designed for unloading tanks and guns upon enemy beaches, these landing craft are adaptable to handling of bulldozers, power shovels, and other large items of construction machinery. Any engineer who, before the war, experienced the difficulties of unloading heavy machinery on isolated beaches without piers or dock facilities knows it can be a very tedious and time-consuming process which may seriously affect the progress of the job.

With the new landing craft, however, the engineer is to a large extent freed of limitations imposed by old methods. He is no longer restricted to existing docks and piers, a deep-water harbor is no longer necessary, slow and laborious lightering can be dispensed with, labor costs are reduced because stevedoring is not needed so extensively, and construction operations do not have to await a lengthy build-up of equipment and supplies from ship to shore. Many insular areas denied to the engineer by these pre-war restrictions can now be opened to modern construction methods. Insular development which has been largely dependent on existing harbors and docks, can now proceed regardless of port facilities.

Essentially an ocean-going, high-speed cargo ship, the interior and single top deck of which provide maximum storage

(Continued on page 168)

SPECIALLY-DESIGNED SLINGS speed handling of fuel drums by ¾-yd. dragline crane and tractor-operated 20-ton crane.

TRANSFORMATION from dimly lighted, timber-trussed structure (below) to bright, modern interior (above) is accomplished by replacing old timber craneway columns and trusses and inadequate glass area of roof monitor with modern steel construction and new roof incorporating corrugated glass skylights.

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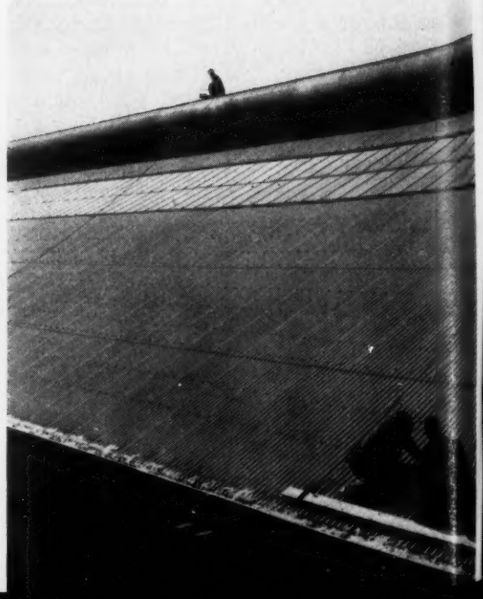
Machine Shop Rebuilt

Without Delaying Ship Repairs



AT THE START OF THE WAR, the Bethlehem Steel Co. was called upon to revamp its Hoboken, N. J., ship repair yard to handle work on large numbers of vessels for the Navy and the Maritime Commission. Reconstruction was carried out expeditiously on such a scale as to make the yard the most modern in the East.

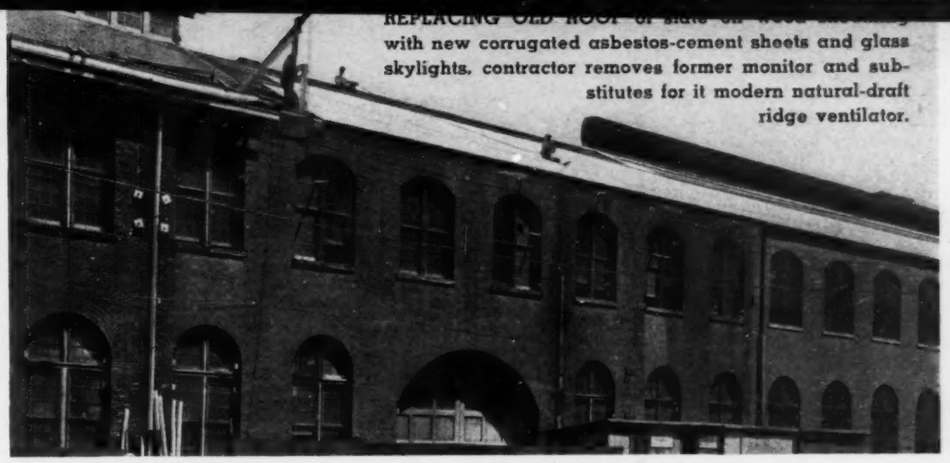
Increased demands on the existing machine shop later made it necessary to extend the shop and to renovate and alter the existing sections as follows: (1) Remove the old roof and monitor and replace them with a new roof, skylights and ventilator; (2) remove wood craneway columns and trusses and replace them with steel; (3) remove old wood flooring and replace it with new concrete and wood block.

Because of the urgency of the ship repair work, it was necessary to keep the shop in operation at all times. To avoid unnecessary delays, the Bertoldi-Kelter Co., Inc., contractor, submitted progress schedules to the Bethlehem Steel Co.'s engineers and the yard management, and these men cooperated in working out the final schedules. Each step was so scheduled as not to hold up any ship repair jobs in progress in the machine shop. To eliminate interference with shop work, reconstruction was carried out in successive sections of the building, 100 ft. at a time being scaffolded and protected.

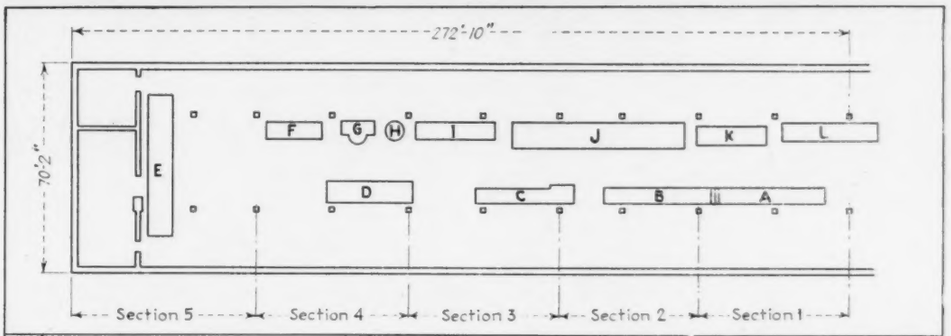
As a means of providing continuous employment for a group of skilled workmen, it was decided to train a crew and to keep it employed throughout the job, working alternately on roof and trusses. In each section of the building, this crew was shifted from the roof to the trusses and vice versa as required.

Work on the roof was undertaken first. The building is a brick wall-bearing

(Continued on page 130)

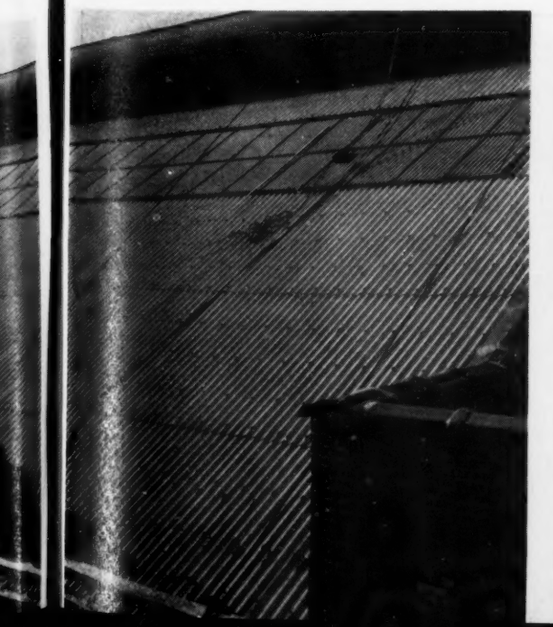


REPLACING OLD ROOF with new corrugated asbestos-cement sheets and glass skylights, contractor removes former monitor and substitutes for it modern natural-draft ridge ventilator.

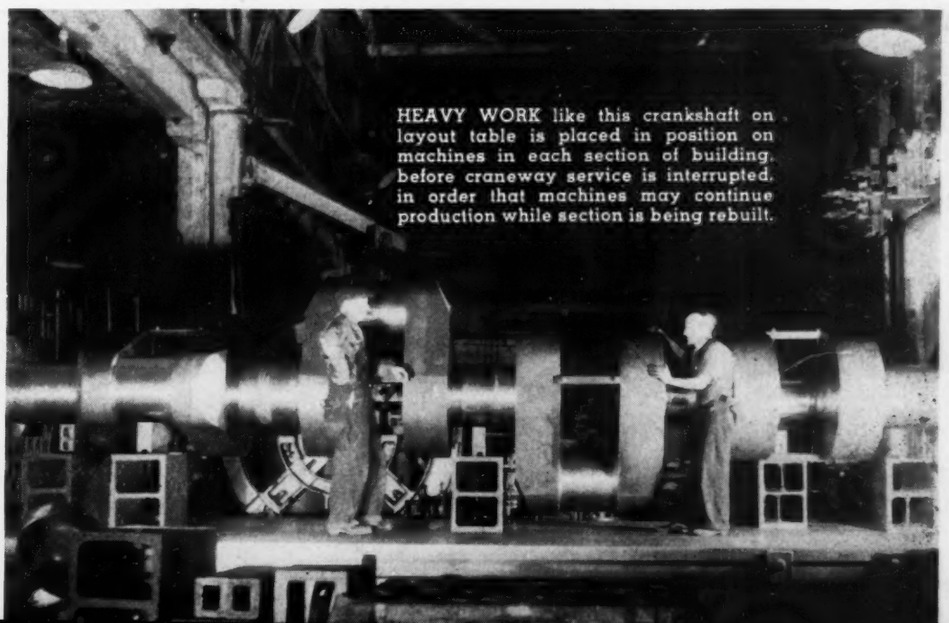


Item	Subject	Section 1		Section 2		Section 3		Section 4		Section 5	
	Operation	Time	Dates	Time	Dates	Time	Dates	Time	Dates	Time	Dates
1	Cut around cols. to allow removal of base	2	7/10 7/11	2	8/7 8/8	2	9/5 9/6	2	10/16 10/17	2	11/13 11/14
2	Remove elect. & mech. work	4	7/12 7/17	4	8/9 8/14	2	9/7 9/8	2	10/18 10/19	2	11/5 11/6
3	Shore cols. & crane rail	4	7/18 7/24	4	8/15 8/21	4	9/11 9/14	4	10/19 10/24	4	11/7 11/24
4	Remove wood trusses & crane rail	4	7/24 7/27	4	8/22 8/25	3	9/15 9/19	3	10/25 10/27	3	11/24 11/28
5	Remove col. found. & replace with conc. & cut cols. off	2	7/28 7/31	2	8/27 8/29	2	9/20 9/21	2	10/30 10/31	2	11/29 11/30
6	Set steel & rivet	2	8/1 8/3	6	8/30 9/7	6	9/22 9/29	6	11/1 11/9	6	12/1 12/8
7	Misc. blocking, fillers & cutting	2	8/4 8/7	2	9/8 9/11	2	9/30 10/1	2	11/10 11/13	2	12/11 12/12
8	Drill cols. for bolts	2	8/8 8/9	2	9/12 9/13						
9	Remove shoring & install gusset R's to hold crane rail	1	8/10 8/10	1	9/14 9/14	1	10/2 10/2	1	11/14 11/15	1	12/13 12/13
10	Paint steel	1	8/11 8/11	1	9/15 9/15	1	10/3 10/3	1	11/15 11/16	1	12/15 12/15
		24 Days		28 Days		23 Days		23 Days		23 days	
		Completed-23 days		Completed-28 days		Completed-23 days		Completed-18 days		Completed-18 days	
	Machine	Operational Time Loss									
		Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual		
A	Betts lathe - double mach. - 2 ends	6	2								
B	Ditto			2	1						No loss estimated in this section
C	Lathe 80					3	1/2				
D	6" boring bar							2	1		
E	Big planer										
F	Plate mach.							None	---		
G	To be removed										
H	Ditto										
I	Pittsburgh lathe					3	—				
J	Large lathe			10	2						
K	5" boring bar	6	1								
L	Hydraulic planer	6	1								

LAID OUT FOR PROGRESSIVE RECONSTRUCTION, section by section, machine shop rehabilitation to modern standards is carried out by contractor in accordance with time schedule developed cooperatively with engineers and shop superintendent to maintain uninterrupted operation during rebuilding, involving minimum loss of time by machines working on ship repairs.



CORRUGATED ASBESTOS-CEMENT SHEETS and corrugated glass skylights (below) are laid on roof slope rising to new natural-draft ridge ventilator by same crew which alternates on erection, section by section, of interior steel framing to replace old timber column and truss construction for craneway. By utilizing one crew for both interior and exterior work, contractor maintains continuous employment for one group of men, thus expediting all operations.



HEAVY WORK like this crankshaft on layout table is placed in position on machines in each section of building, before craneway service is interrupted, in order that machines may continue production while section is being rebuilt.

Access Road in Costa Rica Taps Fresh Source of QUININE

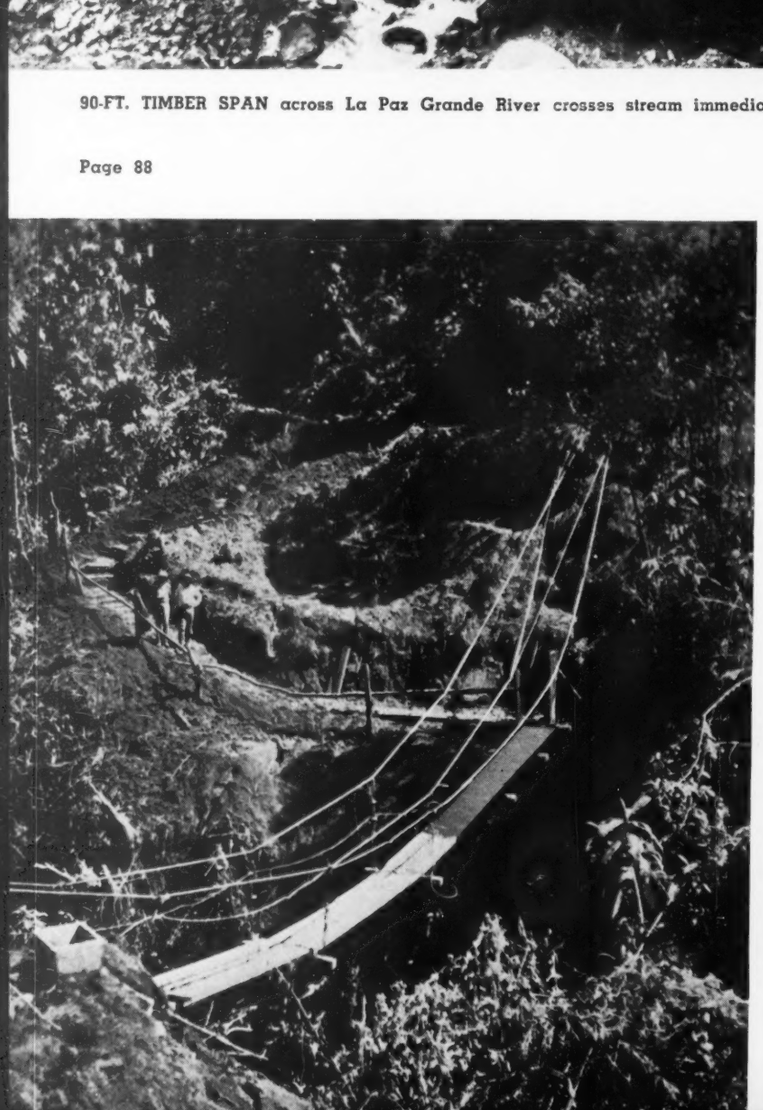
90-FT. TIMBER SPAN across La Paz Grande River crosses stream immediately below 30-ft. waterfall.

Construction problems on an especially difficult 71-mi. section of the Inter-American Highway through Costa Rica were described in Construction Methods, August, 1945, p. 84. The accompanying notes concern difficulties experienced in constructing an 8-mi. stretch of access road to a cinchona plantation near San Jose, Costa Rica.

DURING THE LAST YEAR the Public Roads Administration has been engaged in supervising construction of an all-weather road to provide access to a cinchona plantation which the United States Commercial Co., a subsidiary of the Foreign Economic Administration, is developing in Costa Rica as a source of quinine. The final construction link, a 90-ft. bridge across La Paz Grande River, was completed recently and the entire road is now in use, Public Roads Commissioner Thomas H. MacDonald has announced.

The access road extends from a junction with the improved Poas Volcano road, 25 mi. north of San Jose, capital of Costa Rica, to the cinchona plantation, a distance of approximately 8 mi. in a region that formerly could be reached only by laborious travel over a narrow ox-cart road and mountain trail. In the rainy season, the ox-cart road was hub deep in mud.

On June 16, 1944, the United States



← SUSPENSION FOOT-BRIDGE across La Paz Grande River in Costa Rica is used by work crews while 90-ft. timber bridge on access road is under construction.

ROCK BARRIER (below) on steep mountain slope is removed by drilling crew preparatory to constructing approach to bridge across La Paz Grande.

60-IN. METAL CULVERT, with concrete wing walls, carries flow of Rio Santiago during frequent heavy rains in region.

HAND-PLACED STONES are used in repairing bad spots in subgrade of 8-mi. cinchona plantation access road, following rough grading operations.

Commercial Co. allotted $340,000 for road construction work. On the same date the Public Roads Administration, at the request of American Cinchona Plantations, Inc., employed the Ralph E. Mills Co., Roanoke, W. Va., a contractor already operating in Costa Rica on the Inter-American Highway, to build the access road.

Road Traverses Rough Terrain

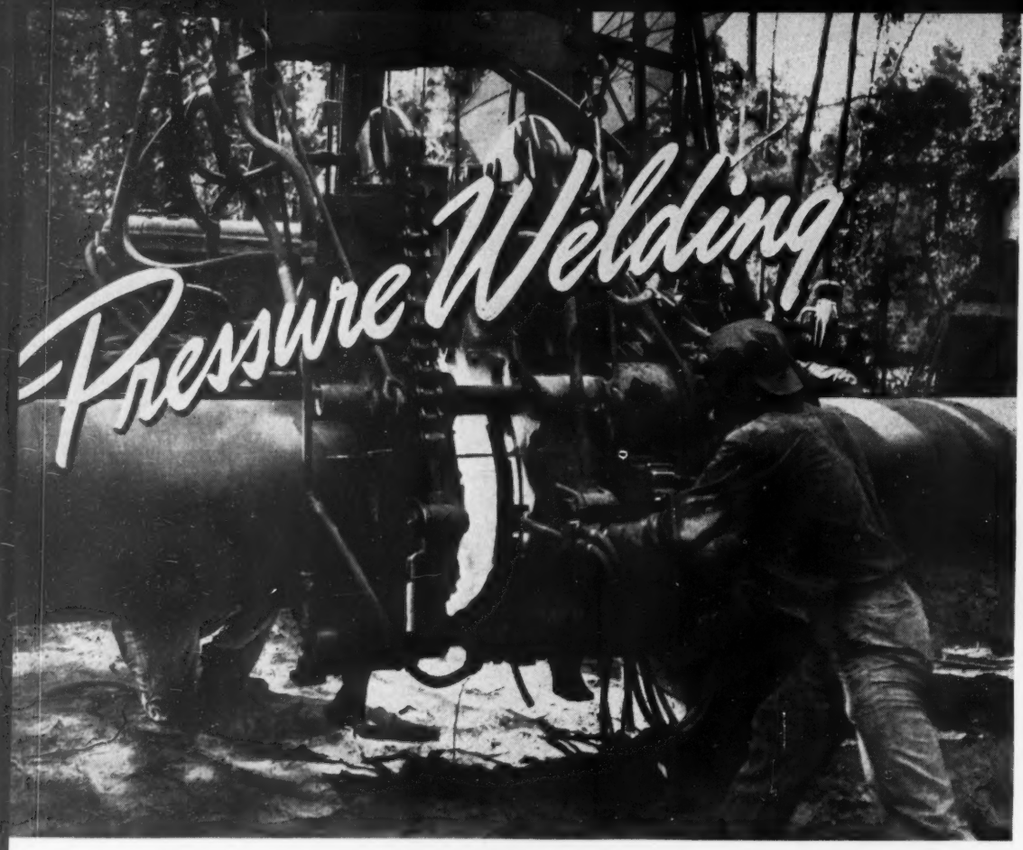
The region traversed by the road is rough and the mountain slopes are unstable. Construction required careful location and the use of heavy equipment for rapid progress. It was necessary to finish the job as quickly as possible to avoid delay in planting operations and the shipment of bark from mature cinchona trees growing in the area. Through the efforts of Col. Arthur F. Fischer, liaison officer between the War Department and the Foreign Economic

(Continued on page 166)

COMPLETED SECTION shows sharp turns and steep grades required in constructing access road. Maximum allowable grade on road is 12 percent.

ROCK CRUSHER (below) is set up in old quarry to furnish material for road construction and aggregate for bridge abutments.

ROCK QUARRY (below) near Rio La Paz Chico furnishes material for heavy stone base and crushed rock surface of access road.



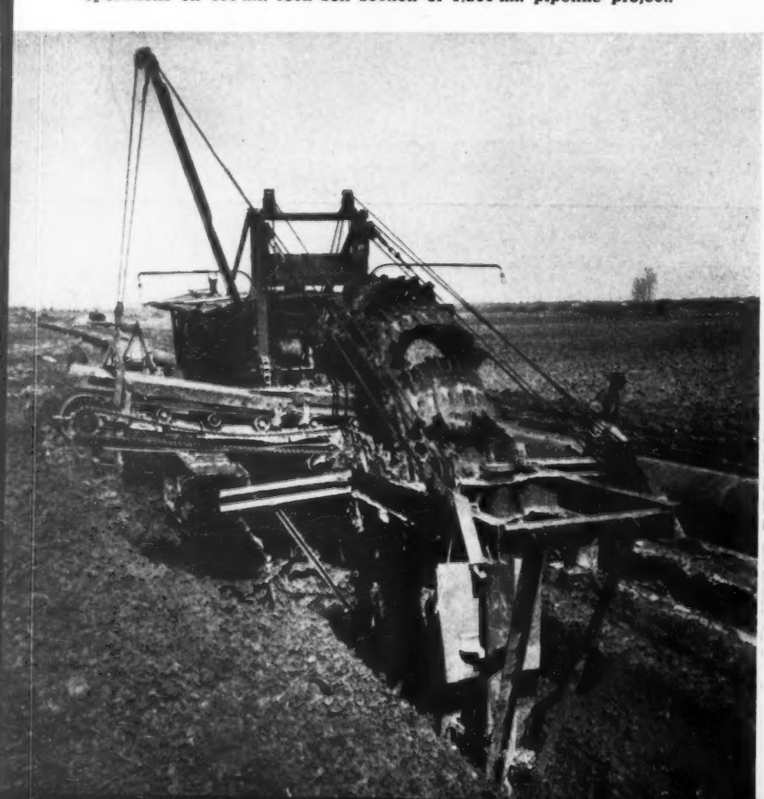
← **JETS OSCILLATE ACROSS WELDING ZONE** to bring entire area to temperature of 1,050 to 1,200 deg. C. before surfaces are brought together under pressure of hydraulic rams. Chain and toggle device aligns ends of pipes.

Speeds Work on 1,265-MILE PIPELINE

PRESSURE WELDING WAS USED for the first time on a major scale on a 320-mi. section of the 1,265-mi. natural gas steel pipeline from Corpus Christi, Tex., to Cornwell, W. Va. Of the 1,265-mi. total length 1,180 mi. was laid with 24-in. pipe, and 85 mi. at the West Virginia end with 20-in. pipe, all ¼ in. thick except at submerged river crossings, where the thickness was increased to ⅜ in. The line, arc welded throughout its entire length—except for the 320-mi. Texas section—and cold wrinkle bent to conform to the terrain it traversed, was built by the Tennessee Gas & Transmission Co. at a cost of $54,000,000. It carries a capacity load of 207,000,000 cu. ft. of natural gas to the Appalachian area near Pittsburgh, making it possible to market a product which would be otherwise vented and lost.

Pressure Welding Introduced—Extensive use of pressure welding on this project introduced a construction technique which saved time, equipment and man-hours. This innovation plus that of cold wrinkle field bending of the thin-shelled large-diameter pipe were major factors in completing the task at an un-

TRENCH THROUGH SWAMPS AND LOWLANDS (below) in seven states traversed by large-diameter thin-shelled pipeline is dug to specifications of 40-in. width and 30-in. minimum pipe coverage. In rocky terrain minimum pipe coverage is reduced to 24 in. and pipe is given padding of sand and dirt. Frequent use of air hammers and blasting is required in trenching operations on 400-mi. rock soil section of 1,265-mi. pipeline project.



COLD WRINKLE BENDING (below) of large-diameter pipe adjusts line to irregularities of terrain. Here, section of pipe is inserted in bending clamps which cause outward wrinkle to form when horizontal pull is applied to far end of pipe. Short end of pipe in foreground is held by yoke to give added rigidity to portion within clamps where wrinkle is formed. "Camouflage" job with tree branches on bending machine protects workers from sun.

CLAMP WITH JAWS FOR ALIGNING PIPE, jets for heating metal of abutting joints and hydraulic rams for applying pressure for autogenous welding are lowered into position by tractor side boom. Controls on tractor regulate hydraulic pressure of rams and flow of cooling water which removes excess heat from castings of welding unit. Side boom on leading tractor aligns length of pipe for welding operation.

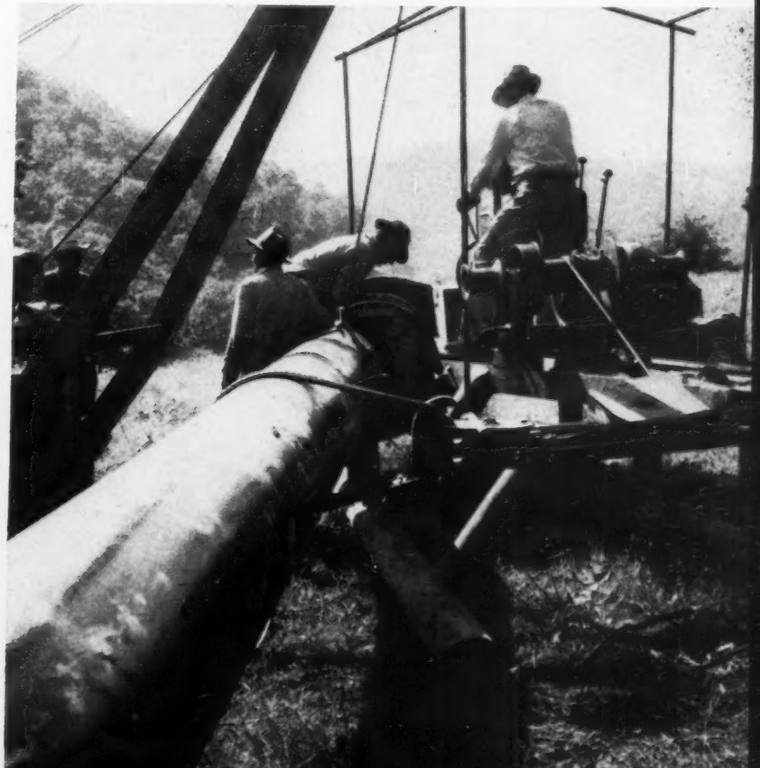
precedented speed for a major installation of this nature. Only 293 days elapsed from the time the first main-line pipe was welded until the last tie-in was made on the Tennessee Gas & Transmission Co. system.

Pressure Welding Defined—Pressure welding, or solid phase welding, is a process by which structural members are bonded by pressure without the presence of metal in a liquid phase. It comprises the pressing together of clean, smooth surfaces so as substantially to exclude air, maintaining suitable pressure while heating metal uniformly to effect a bond.

As a result of experimentation it has been found that the method by which a sound, strong weld is obtained without the melting and fusion usually associated with the formation of a weld comprises atom transfer across the contacting sur-

WELDING HEAD WITH JAWS IN OPEN POSITION (below) is fired to show uniform distribution of 365 oxyacetylene heating jets. Pressure welding of joints is used on 320-mi. Texas end of 1,265-mi. line.

PIPE BENDING MACHINE (below) which utilizes expanding mandrel to prevent distortion of pipe while forming cold wrinkle bend has special block on pulling line to permit quick handling of cable sling.



COLD-WRINKLE-BENT PIPE is welded into line and treated with priming coat of anti-corrosion enamel. Each wrinkle in this section of pipe represents 2½-deg. change in slope.

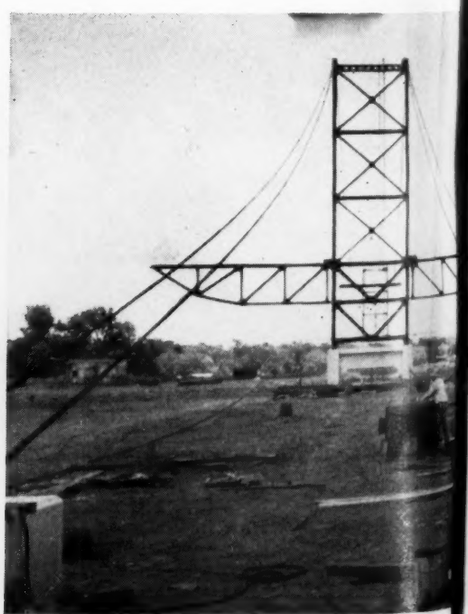
SUBMERGED MULTIPLE LINES are used in crossing navigable and hazardous streams. Here, three 16-in. lines with ⅜-in. wall thickness are substi-

faces of abutting members in accordance with the laws of diffusion, with a resultant trans-interface crystallization.

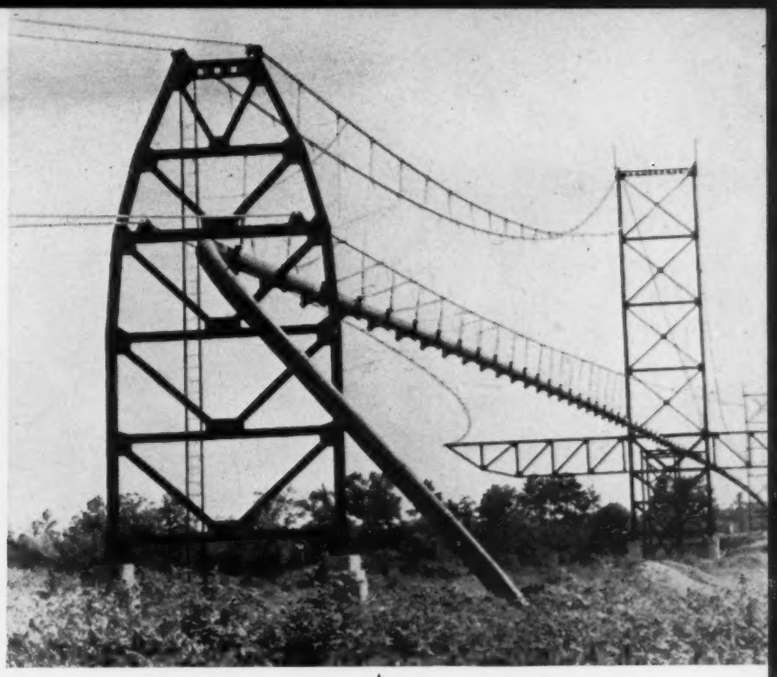
Temperature is the dominant factor in the practical application of solid phase welding. A temperature of 1,050 deg. C. appears to be the feasible minimum for steel, with a maximum of about 1,200 deg. C., well below the melting point of the lowest melting constituent of the metal.

Special Welding Clamp Used—A welding head with 365 oxyacetylene jets is clamped around the joint to heat the metal uniformly to 1,050 to 1,200 deg. C. At this temperature the material becomes plastic, and upsetting of the joint occurs under pressure applied by hydraulic rams which are an in-

HOT COAT OF ENAMEL (below) is followed by asbestos felt wrapping. Tractor, with side boom, supports section of line over which wrapping machine passes. Line ahead is cleared of cribbing by two side-boom tractors.

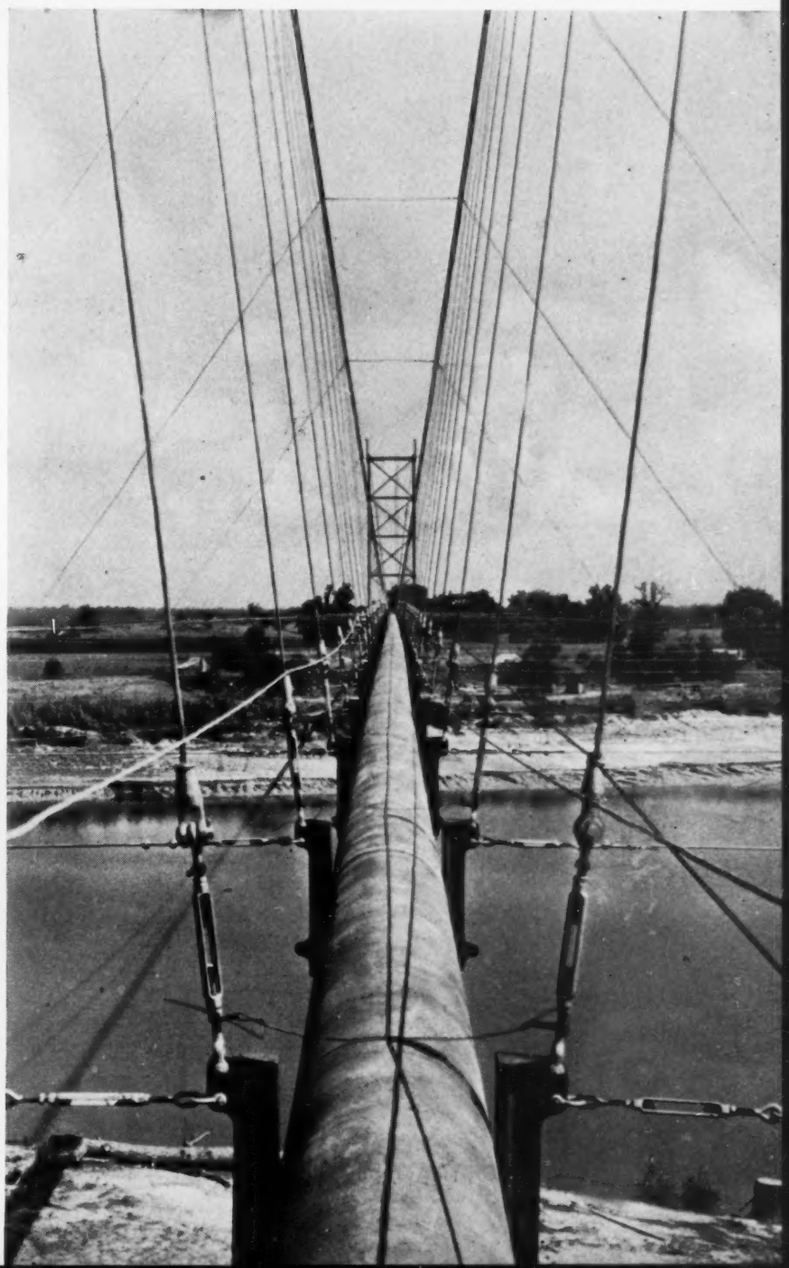


tuted for 24-in.-dia. line. Wood slats protect coating as lines are launched by side-boom tractors.



RED RIVER CROSSING NEAR NACOGDOCHES, LA., has 1,280-ft. main span (below) and one loaded side span (above) 640 ft. long. Pipeline rests in saddles which permit shifting due to temperature changes without stressing. Saddle design provides for second line to be suspended beneath present one.

American Hoist & Derrick Photo



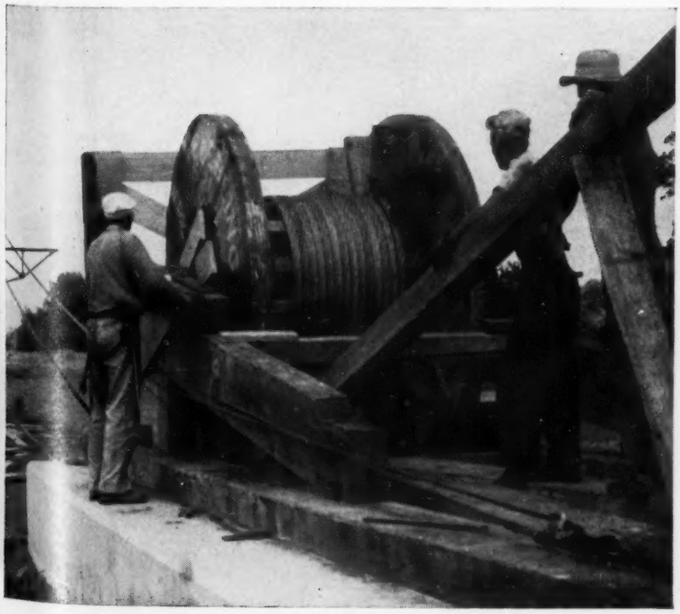
tegral part of the welding clamp. The heat, pressure and forging action produces a weld of superior quality in which the joint is as strong and ductile as the base material and of identical chemical composition.

Pressure welding of large-diameter pipe joints took less time, less equipment and 25 less men per spread than conventional welding methods. Use of the pressure weld clamp permitted the completion of a welded joint in about 1½ min.

Except for the 320 mi. on which the pressure welding method was used, the pipe sections were joined together by electric welding. Both rolling and position, or "stove pipe," methods of joining were employed as determined by terrain and

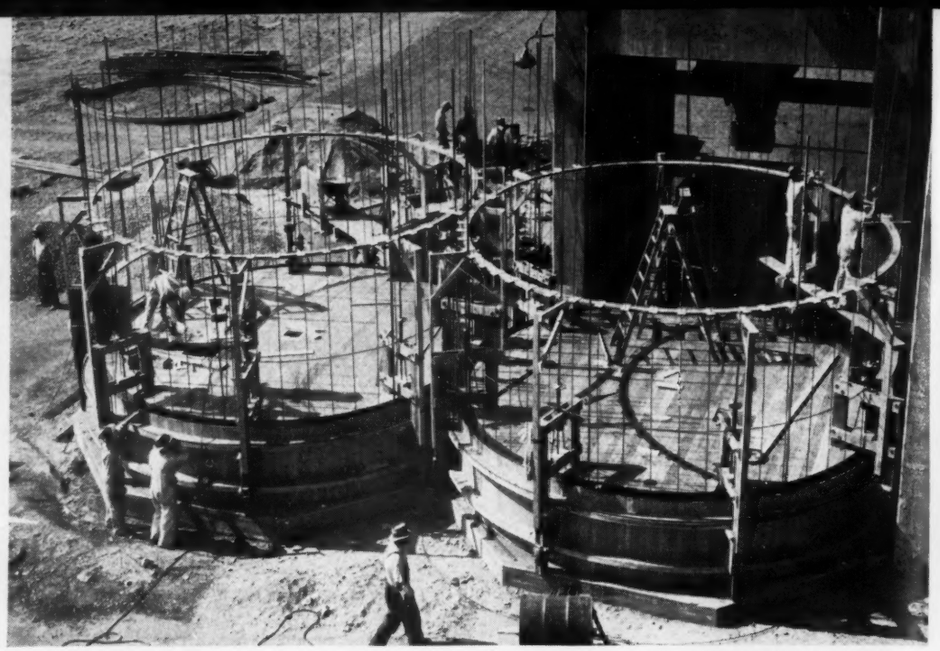
(Continued on page 138)

WIRE ROPE IS PLACED OVER TOWERS (below) for aerial crossing of 24-in. line over Brazos River near Wallis, Tex.

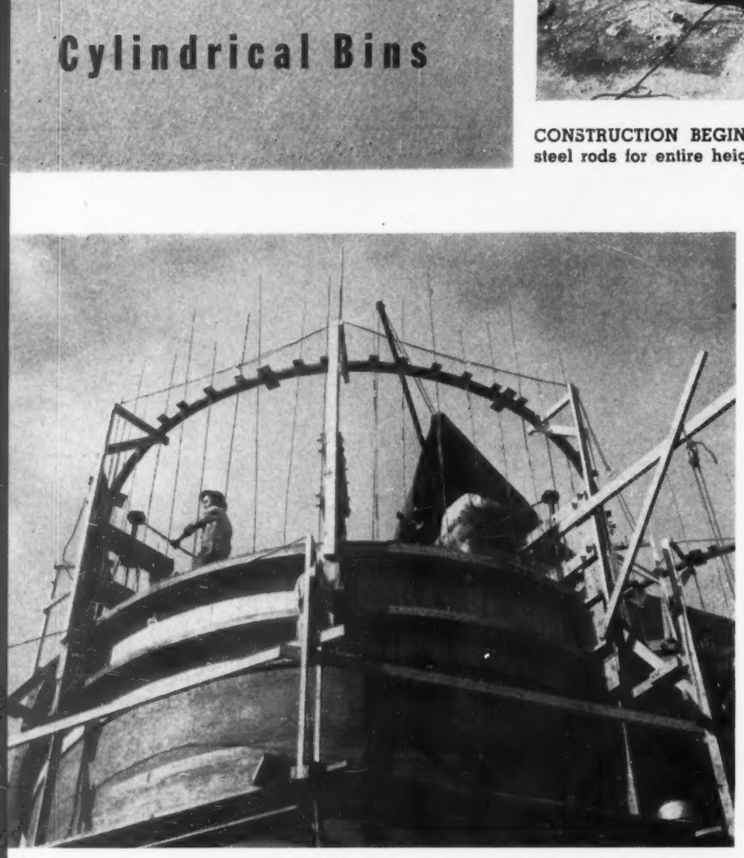


Sliding Forms

Permit Continuous Concreting of Cylindrical Bins



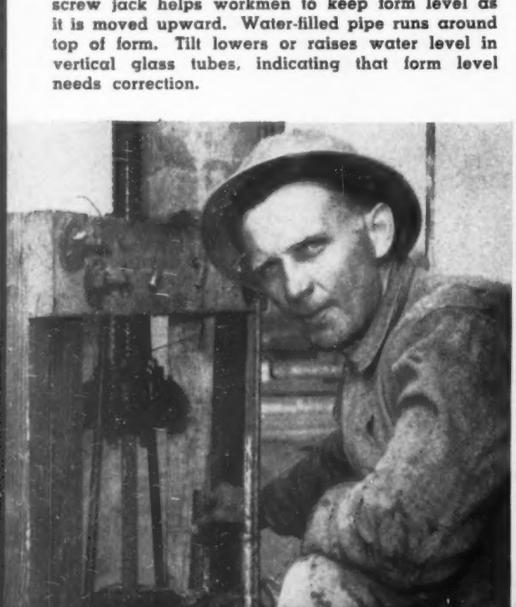
CONSTRUCTION BEGINS on two interlocking circular storage bins. Narrow forms will be jacked up steel rods for entire height of structure.

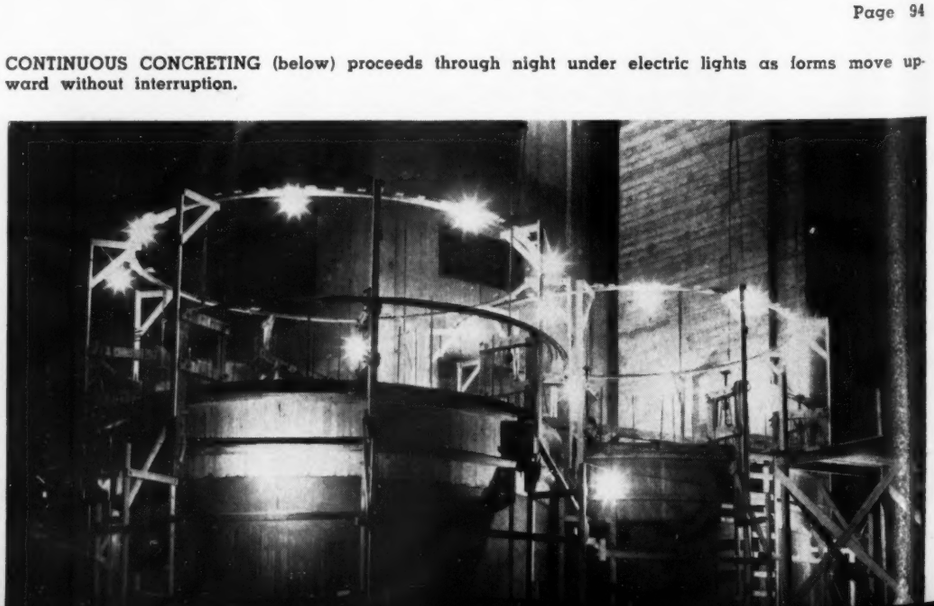


SCREW JACKS are turned to move form up rods at rate of 7 in. per hour. Operation of one of 17 screw jacks used is shown in closeup at right.

GLASS WATER LEVEL INDICATOR (below) beside screw jack helps workmen to keep form level as it is moved upward. Water-filled pipe runs around top of form. Tilt lowers or raises water level in vertical glass tubes, indicating that form level needs correction.

CONTINUOUS CONCRETING (below) proceeds through night under electric lights as forms move upward without interruption.

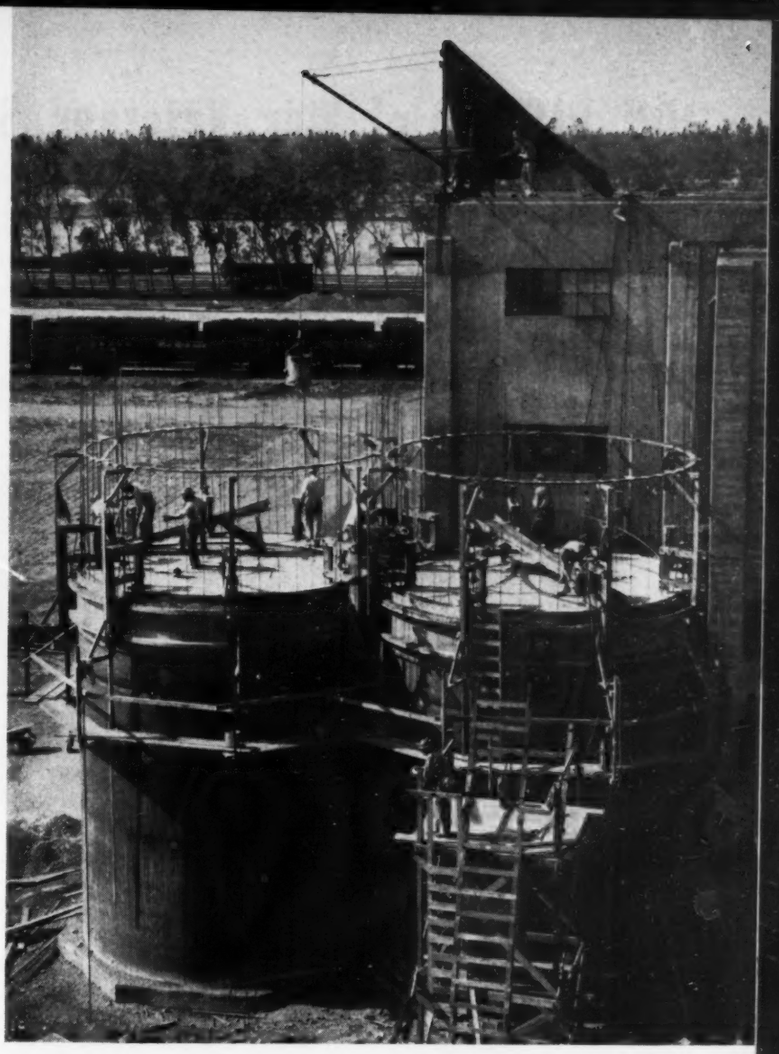




USING SLIDING FORMS for continuous concreting of cylindrical structures at the Fontana, Calif., steel mill of the Kaiser Co., Inc., the corporation's construction forces first built a water tower and then a pair of intersecting bins for storage of flake pitch in the coal handling yard. The cylindrical towers are 20 ft. in diameter and 50 ft. high, with a 10-in. wall thickness.

Accompanying photographs show the slip-form method of construction at the second site, where the setting of the forms was somewhat more difficult because the bins interlocked.

The single form was started at the bottom of the bins. Around its inner circumference were 17 screw jacks operating on steel rods which were extended the full height of the proposed structure by embedding additional rods in the concrete walls as work progressed. Concrete was poured into the open top of the form in the usual manner. As it set, the form was moved up the rods by the screw jacks at the rate of about 7 in. per hour. The pouring and lifting were, in effect, continuous. To check the form level at all times, a water-filled pipe was strung completely around the top of the form. Connected to the pipe at each jack was a vertical glass tube with the correct water level plainly indicated.



AS FORMS RISE toward top of bins, additional jack rods are embedded in concrete walls to provide for successively higher lifts.

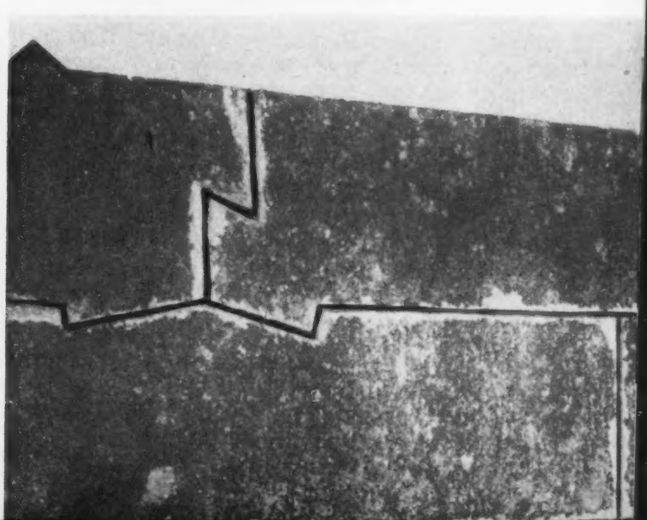
SAWED CORAL WALLS HAVE *Interlocking Joints*

WHEN SEABEES TOOK OVER on the island of Okinawa they found among interesting examples of construction the screening-wall shown in the accompanying pictures. This wall, built by the Okinawans, used intricate joints to bond the top course of the sawed coral blocks into the course next below. Apparently the builders believed that this method of construction added enough to stability to justify the considerable amount of extra time and care required for cutting and fitting.

The building showing in the background, one of the typical better-class country dwellings, was converted into offices to serve as headquarters for the 11th Naval Construction Brigade, the source of the accompanying illustrations.

INTERLOCKING JOINTS were used by Okinawans in cap stones of this courtyard screening-wall. Typical better-class country dwelling shown in background was converted into offices for Seabee brigade headquarters.

CLOSE-UP VIEW shows interlocking joints in top course of wall made of sawed coral. Stability was increased by this method of construction.



JOB RIGHTS of War Veterans Seeking Employment by Industry are Officially Defined and Clarified

By MAJOR LAURIE C. GREEN

Assistant Information Officer,
Selective Service System,
Washington, D. C.

INDUSTRY AND BUSINESS, long mindful of their obligation to provide employment for the returning war veteran, now realize the opportunity that is open to them in recruiting workers from among the men and women who have served in our armed forces.

Service in the greatest war of all time has done much to qualify these young people for service in the era of prosperity that lies ahead. They have learned valuable lessons of discipline, but beyond that, they have acquired new skills and their bitter experiences have engendered a new sense of values, a higher appreciation of the opportunities open to them in a peacetime world. They constitute, in fact, the most desirable and promising group from which industry and business can draw the manpower necessary to meet the demands of the years ahead.

Rights Have Been Earned

Industry in general realizes that the returning veteran is not a "problem." Save in exceptional cases, the man who has endured even the severest of combat conditions is coming home a normal individual, ready to forget what he has been through and anxious to return promptly to normal living. Throughout his service he has looked forward to the day when he would be coming home. He has taken full advantage of what the services offered in the way of training and preparation for a better and more secure place in his country's economy. He is given special consideration by law and on moral grounds, not because he constitutes a "problem" or a "special case," but rather because he has given years of his life to his country and is entitled to a "break," a chance to pick up where he left off and not be penalized for having served.

Cooperation by Management

Business and industry have given their hearty endorsement to the broad program to provide employment for returning veterans. As a whole, management has cooperated to the fullest with the Selective Service System in carrying out the System's responsibility of assisting discharged veterans to regain the jobs they left to enter service. But the task of helping the great majority of service men and women who are not returning to their old jobs is one of the major responsibilities of industry.

The Congress, when it wrote the Selective Training and Service Act in 1940, foresaw some of these problems. It placed upon the Selective Service System the responsibility of assisting the discharged veteran to obtain employment. In fulfilling this responsibility, Selective Service has found management responsive to the need for understanding of the veteran and his problems. The 6443 Selective Service local boards, each of which is officially designated as a "Veterans Information Center," have established and are maintaining close liaison with business and industrial leaders within their respective communities and the readiness of management to cooperate has contributed immeasurably in the organization of the veterans' assistance program.

Under the law requiring the Selective Service System to act for the veteran in assuring him of his reemployment rights, contact with industry normally is through reemployment committeemen, one or more of whom are attached to each local board. The law provides that the veteran is entitled to reinstatement in the job he left to enter service or in one of like seniority, status and pay, if the position was with a private employer or the federal government, its territories or possessions, or the District of Columbia; if the position was other than temporary; if the veteran applies for reinstatement with 90 days after separation and has a certificate of "satisfactory completion of his training and service"; and if the circumstances of the employer (if a private employer) "have not so changed as to make it unreasonable or impossible" to restore him to the job. If the veteran is hospitalized immediately upon separation, he may apply for reinstatement at the termination of hospitalization provided it does not continue for more than a year.

The law requiring restoration of veterans to their former positions does not apply to previous employment by states and their subdivisions. However, a number of states have proved reemployment rights for veterans by law or otherwise.

Veterans' Reinstatement Rights

After he is restored to the position, the veteran may not be discharged without cause within a year. In addition, he is entitled to restoration without loss of seniority and shall be considered as having been on furlough or leave of absence during his period of service. He also is entitled to participate in insurance or other benefits "offered by the employer pursuant to established rules and practices relating to employees on furlough or leave of absence in effect with the employer at the time such person entered military or naval service."

A much discussed phase of the law is that relating to seniority. The question heard most often is: Should the veteran be permitted to replace a non-veteran with greater seniority?

Major General Lewis B. Hershey, director of Selective Service, in a recent discussion of this phase of the problem, stated that some people have said the law should not mean that a veteran gets his job or one like it back when a non-veteran of greater seniority must be displaced. "As an administrator," General Hershey continued, "I had to decide what it did say and to aid the veteran to obtain his rights under the law as now written. The few cases that have reached the United States courts have generally sustained our interpretations. The Congress has been aware of our interpretation for about eighteen months, and although it has during that time dealt with this particular section of the law, it has made no change in it."

Seniority Rights

Selective Service has consistently held that a returning veteran who meets all the reemployment conditions of eligibility required by the statute, has an absolute right of restoration to his former position or a position of like seniority, status and pay. Selective Service submits that the only conditions upon the veteran's right to reinstatement are those specifically enumerated in the Act.

(1) That the veteran receive a certificate of satisfactory service.

(2) That he still be qualified to perform the duties of his position.

(3) That he make application for reinstatement within the required 90 days.

(4) That the restoration be not unreasonable or impossible because of the employer's changed circumstances.

Since that portion of the Act (section 8 (b)) which specifically enumerates the conditions precedent to the veteran's right to be restored does not contain an express condition subjecting the veteran to the relative seniority rights of others, Selective Service concludes that none may be implied and that consideration of the Act as a whole shows that none was intended.

Hundreds of thousands of the veterans soon to be discharged never had jobs. Large numbers of them went from high schools and colleges directly into the service. These veterans are entitled to aid in finding jobs under provisions of Section 8 of the Selective Service law. Further, the G.I. Bill of Rights states that it is the intent and purpose of Congress to provide an effective job counseling and employment placement service for all veterans so as to provide for them "the maximum of job opportunity in the field of gainful employment."

These are general principles for the reintegration of our veterans to economic life. They do not establish legal rights to specific jobs. However, there is no doubt that the great majority of employers and the great mass of employees want to see these principles equitably applied, and undoubtedly they will be. Unfortunately, the people in the communities where jobs exist and veterans are seeking them, have not always been permitted to solve their problems in their own way. It has been the experience of Selective Service in administering the employment provisions of the law that problems concerning the veteran and his desire for a job can be worked out most satisfactorily at the local level. It is for that reason that the major responsibility in carrying out this phase of the program has been placed upon the local boards and their reemployment committeemen, with a minimum of interference from State and National Headquarters.

Throughout the nation an effort has been made to encourage the veteran seeking a job to call upon his local board for assistance. The board members and reemployment committeemen have been schooled in rendering this service to the veteran. They know that it is their job to find a satisfactory solution to the veteran's problem without sacrificing any of the veteran's rights. They have been instructed to use the assistance of other government agencies and veterans organizations, as well as labor, management and civic organizations.

Help by Local Boards

If the veteran feels he needs assistance in getting back his old job and asks for it, every facility of the local board will be used to aid him. If he wants a new job, the board may assist him in two ways. Where there are local offices of the United States Employment Service, the veteran may be referred to those offices. If there is no local U.S.E.S. office, or if the veteran asks additional help after contacting the U.S.E.S., the board members and the reemployment committeeman will assist him further. This is done most often by personal contact on the part of the board members or the reemployment committeemen with the management of local industry and business.

There are also two additional agencies which cooperate closely with Selective Service. Veterans seeking employment in the government are referred to the U. S. Civil Service Commission, while those wishing work with the railroads are sent to the Railroad Retirement Board.

Requirements for Reinstatement

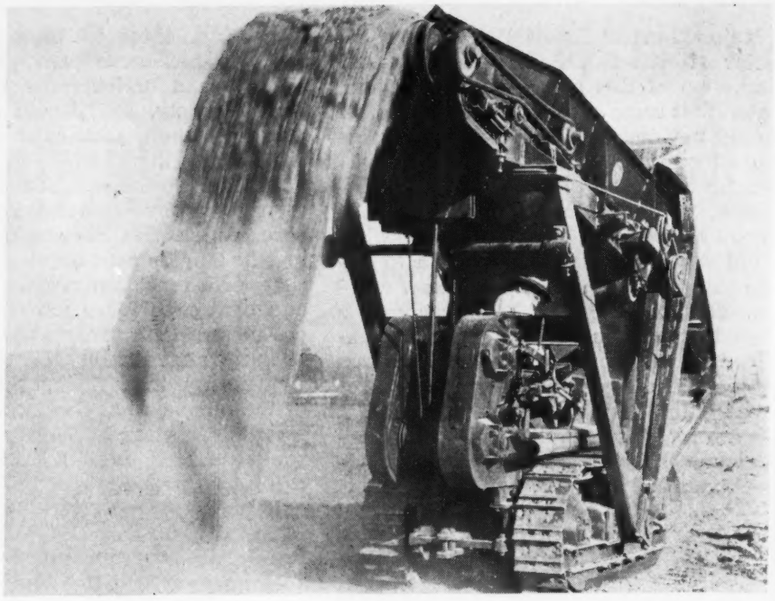
Veterans seeking reinstatement in their former positions under reemployment provisions of the Selective Training and Service Act are not required to meet higher standards than existed in the position at the time they left to enter the armed forces, according to an interpretation announced by Selective Service National Headquarters Oct. 1. "Nor is the veteran required to meet standards which the employer may set for other employees in the same or like positions," the statement continues. "If the position has been so changed in job content that it is beyond the veteran's skill, he is entitled to a job requiring skill comparable to that required by the position which he left at the time he left and equal in seniority,

(Continued on page 156)

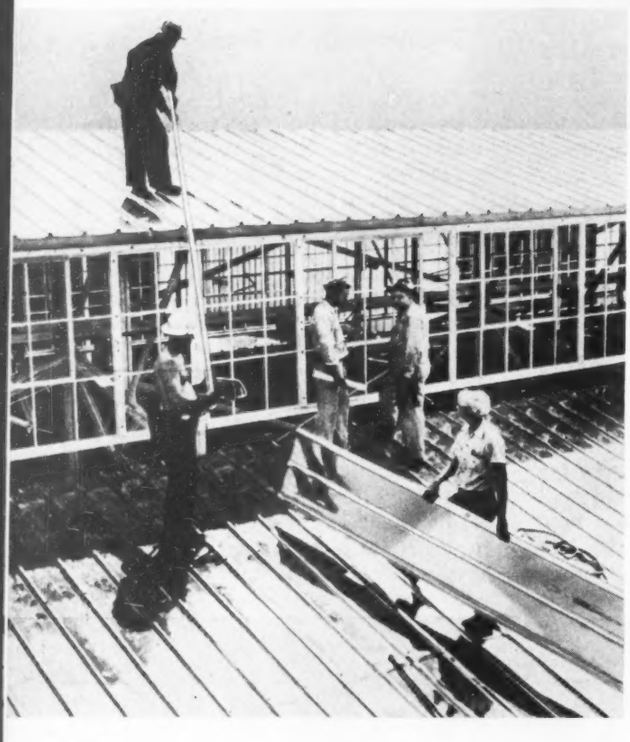
IN CONFERENCE with members of local board of Selective Service System, war veteran receives helpful advice on his rights to reemployment.

HOW They Did It

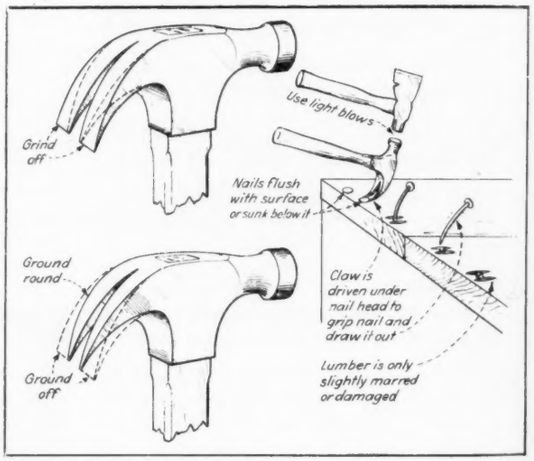
CONSTRUCTION DETAILS For Superintendents and Foremen



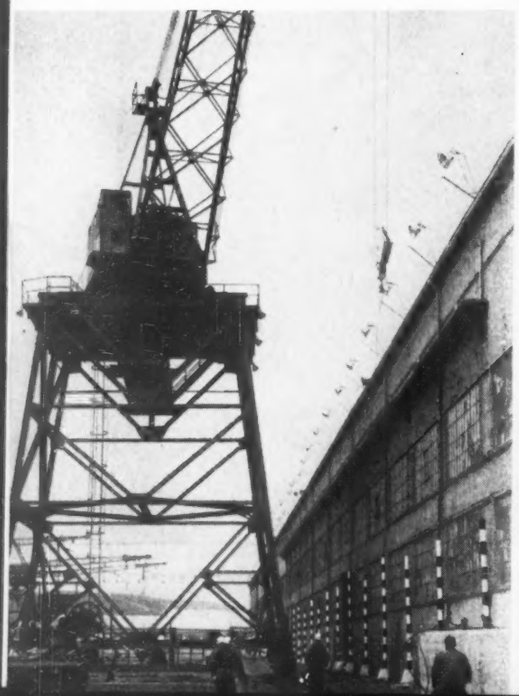
TUNNEL MUCKER is used for excavation on Tucumcari project of U. S. Bureau of Reclamation in eastern New Mexico. Designed by B. "Woody" Williams, project superintendent for Morrison-Knudsen Co., machine moves on crawler tracks and scoops dirt from tunnel floor. Scoop passes backward and overhead to its own conveyor which dumps into truck behind. Mucker, which is designed to operate within 11-ft. 6-in.-dia. horseshoe section, is mounted on TD9 tractor equipped with double-drum hoist unit. One drum drives belt from sprocket wheel built into drum. Lower drum is power unit for bucket.



← **ALUMINUM ROOF** (left) installed over cast house of Reynolds Metals Co. plant at Louisville, Ky., replaces 22-gage galvanized iron roofing material which had to be renewed at 8-month intervals as result of corrosion caused by cast-house fumes. Test panels of aluminum (24S-T pure clad alloy .032-gage sheet) were exposed to cast-house conditions for more than year and showed no appreciable effects from corrosion.

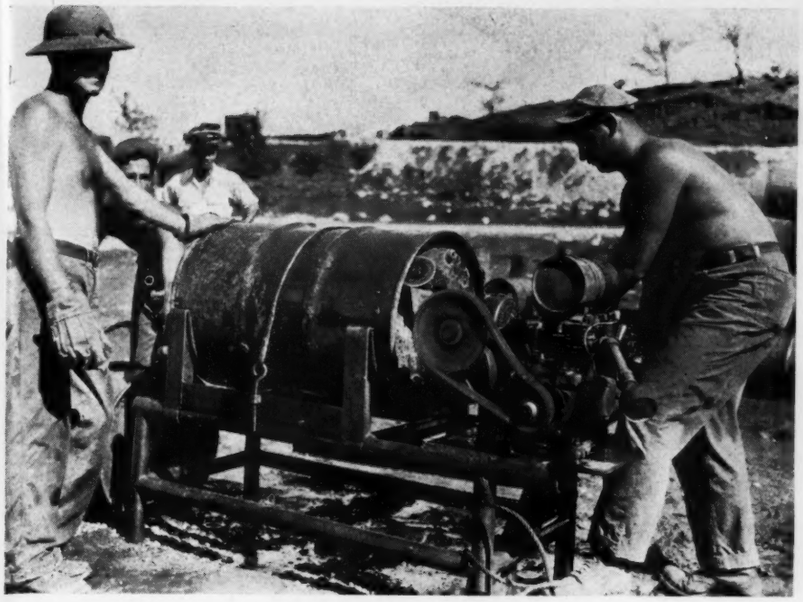

Use light blows
Grind off
Nails flush with surface or sunk below it
Ground round
Claw is driven under nail head to grip nail and draw it out
Ground off
Lumber is only slightly marred or damaged

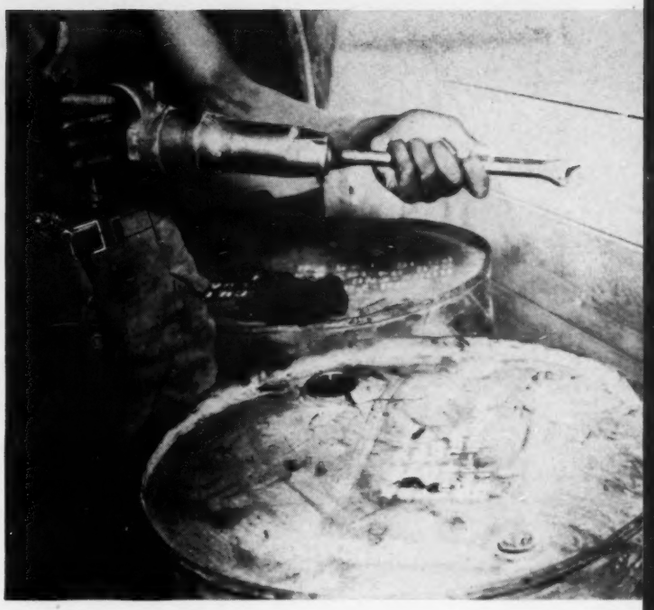
CARPENTER'S HAMMER (right) is altered to specialize in pulling nails driven flush with surface of wood. Flat chisel-like ends of claws are ground down to point and surface that bears against work is ground to rounded shape. Two inner edges of claws are left intact. Claws can then be easily driven under head of nail.—From Pfc. Andrew Vena, U. S. Army.



← **LAYING ITS OWN TRACKS** as it goes, whirley crane moves to another craneway to double up with another crane for getting new riveted barges on to ways at Richmond, Calif., shipyards of Permanente Metals Corp.

→ **LAMINATED PAPER TUBES** furnish cylindrical forms for concrete piers of dormitories at atomic bomb city of Oak Ridge, Tenn., built under direction of Corps of Engineers, U. S. Army. Workman at right is sawing shoulder cutout in top of paper tube.

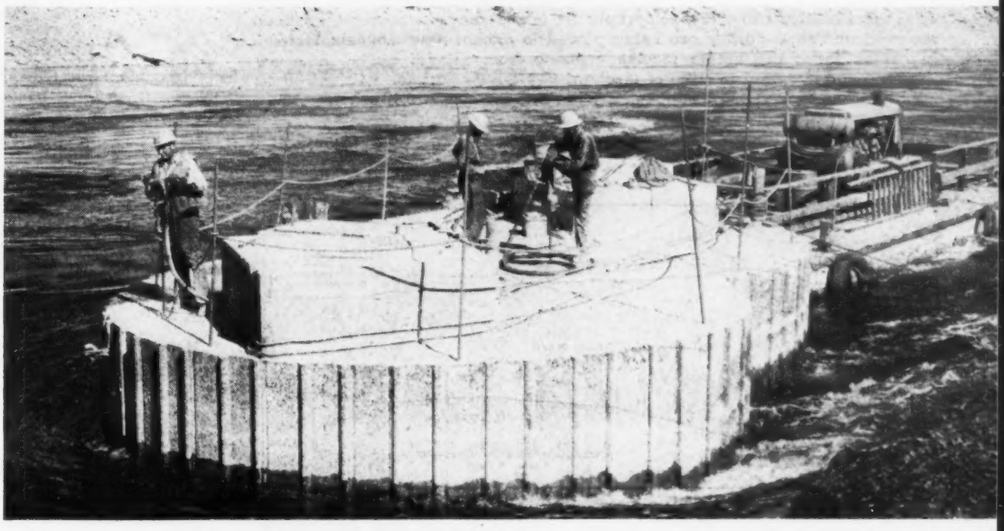




TUBULAR-SHAPED WATER TANK (below) is made up of eight sections of formed plate arc welded at joints to form single unit. Top and bottom sections are constructed of triangular pieces formed, fitted and welded into cap-shaped structures, then joined to each end of shell. Internal bottom head is welded inside tank for extra strength. Built by Hammond Iron Works, of Warren, Pa., tank structure is 75 ft. high and 24 ft. in diameter.

↓ Lincoln Electric Co. Photo

MOTOR-DRIVEN CAN OPENER (left, above) is devised by Seabees on Guam to cut ends off empty oil drums. Small gas engine from wrecked water filtration unit is hooked up to drive cutter head through train of hoist gears salvaged from captured Jap truck. Cutter rides on end of pivot arm which revolves around center shaft. Drum is strapped tight to welded pipe frame and revolving cutter is forced against head by crank and chain crowd made from landing wheel hoist from Jap plane. Similar lid-lifting problem is solved by Aviation Engineers on Saipan (right) who use pneumatic hand tool for removing heads of asphalt drums used in constructing asphalt-surfaced runways for Superfortresses.



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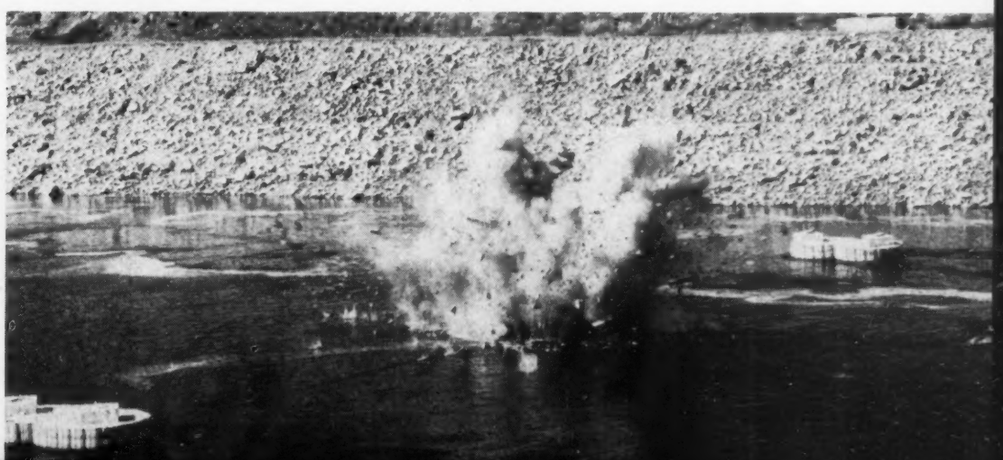
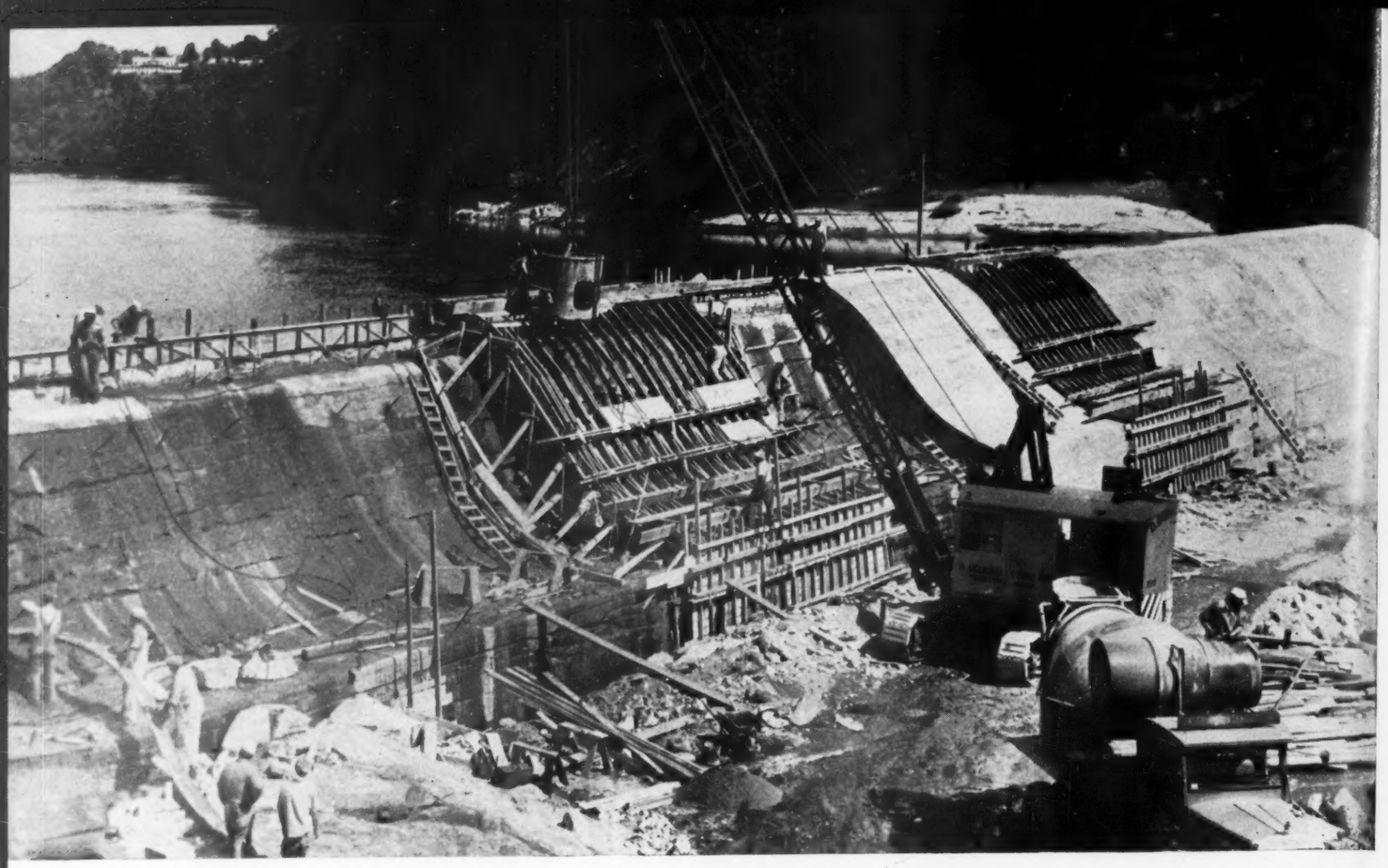
CONCRETE CAP of 480-ton abandoned bridge pier that obstructed flow of Columbia River below Grand Coulee Dam is blasted (below) by U. S. Bureau of Reclamation. Drillers (above) sink vertical holes into 8-ft. thick concrete with jackhammer drills and load them with 650 lb. of dynamite. Barge-mounted derricks later pull out sheetpiling which had been driven into riverbed to form crib for gravel ballast and help support cap. Two flanking piers will not be removed.

↓





THREE STAGES OF REPAIR WORK on disintegrated downstream face of dam are illustrated in this photograph: At left, damaged concrete has been removed and steel dowels are being placed to anchor new concrete blanket. In center, forms are set to receive concrete from 1½-yd. bucket filled by truck-mixer and raised to point of discharge by crawler crane. At right, forms have been stripped from completed section of new concrete blanket.

New Concrete Blanket

Mixed With Air-Entraining Cement

Replaces Disintegrated Face of

40-YEAR-OLD DAM

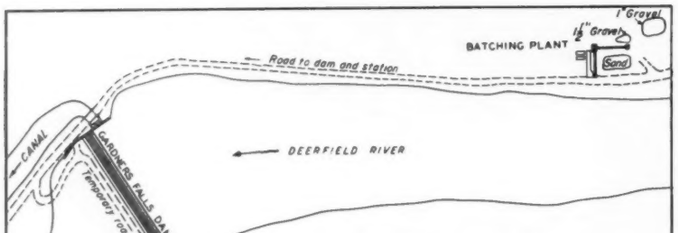


Fig. 1 . . . BATCHING PLANT located ¼ mi. upstream from dam served 5-cu.yd. truck-mixers which delivered concrete for placement by bucket on crawler crane.

SAND AND GRAVEL for concrete are raised by belt conveyor (below) to bin of batching plant.

DISINTEGRATED BY EXPOSURE for 40 years to alternate freezing and thawing, the concrete on the downstream face of the Gardners Falls dam of the Western Massachusetts Electric Co., built in 1904 on the Deerfield River, 1 mi. below Shelburne Falls, has been removed and replaced by a thick blanket of new concrete using air-entraining cement and anchored to the sloping surface of the existing structure by deformed steel dowels. The repair work was done by dividing the dam into 13 sections each 26 ft. long and pouring concrete in alternate sections so that the setting of the forms could pro-

DISINTEGRATION OF CONCRETE on downstream face of 40-year-old Gardners Falls dam is result of alternate freezing and thawing since structure was built in 1904. Damage was repaired by facing with thick concrete blanket anchored by steel dowels.

ceed without interference on days when the section previously formed was being poured. Cement, sand and gravel for the concrete mix were proportioned at a portable batching plant ¼ mi. upstream from the dam, delivered to the job by truck-mixers and placed by a 1½-yd. bucket handled by a crawler crane. Each 26-ft. section of the dam required about 100 cu. yd. of concrete to be poured in a single day.

The 40-year-old dam is a concrete structure 337 ft. long between abutments, about 20 ft. in average height and 24 ft. wide at the base. In 1907 the height of the dam was increased 3 ft., this addition being entirely on the crest, with no increase of the section below. The extent of the disintegration of the

By H. A. MOODY

Hydraulic Engineer
Western Massachusetts Electric Co.
Turners Falls, Mass.

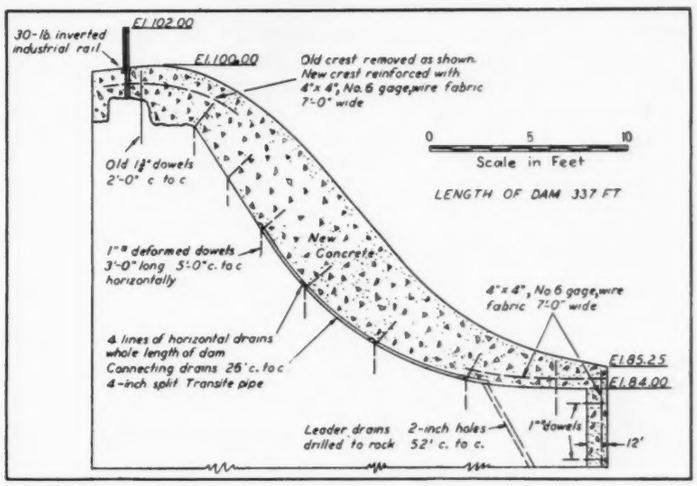

30-lb. inverted industrial rail
El 102.00
El 100.00
Old crest removed as shown. New crest reinforced with 4"x 4", No. 6 gage wire fabric 7'-0" wide
0 5 10
Scale in Feet
LENGTH OF DAM 337 FT
Old 1¼" dowels 2'-0" c to c
1" ø deformed dowels 3'-0" long 5'-0" c. to c horizontally
New Concrete
4"x 4", No 6 gage wire fabric 7'-0" wide
4 lines of horizontal drains whole length of dam Connecting drains 25' c. to c 4-inch split Transite pipe
El 85.25
El 84.00
Leader drains 2-inch holes drilled to rock 5'-2' c. to c.
1" dowels
12'

Fig 2 . . . THICK BLANKET OF NEW CONCRETE, mixed with air-entraining cement, is anchored to sloping downstream face of dam by deformed steel dowels.

TRANSFER CONVEYOR (below, left) receives weighed batches of aggregate and delivers them into drum of 5-cu.yd. truck-mixed (below, right).

WOODEN RIBS OF FORMS, spaced on 19-in. centers, carry stringers which are tied to steel dowels. Plywood panels, measuring 2x8 ft., are fastened to under sides of ribs as concrete is poured.

TRAILER VANS are used to store cement.

concrete on the downstream face is indicated by an accompanying photograph taken July 26, shortly after the refacing work was started.

Since the stability of the upper portion of the dam with its added height was somewhat in question, and because a Guniting job would properly include a coating of its upstream face, involving a large indefinite expense for handling the discharge from the New England Power Co.'s stations upstream, it was decided to remove 18 in. of the present crest and carry a heavy blanket of new concrete from the upstream face over the top and downstream face to the toe of the dam, as shown in Fig. 2.

Heavy steel dowels, 3 ft. long, bent as illustrated in Fig. 2 and spaced 5 ft. apart horizontally, were used to tie the new concrete to the old. Four lines of 4-in. split Transite pipe were placed along the entire length of the dam to collect leakage from the old horizontal joints. These longitudinal drains were connected by a similar vertical drain in each of the 13 sections. In every other section these vertical drains discharge into holes drilled near the toe and down through the concrete base well into the underlying ledge, the seams in which, by test, will carry off all leakage. It is expected that this arrangement will prevent freezing of the drains.

The contract for this work was given to Daniel O'Connell's Sons, Inc., of Holyoke, Mass., which in turn contracted with the Construction Service Co., of Springfield, for transit-mix concrete delivered to their 1½-yd. bucket hung from a No. 6 Northwest crane operating just downstream from the toe of the dam. A portable batching plant was set up about ¼ mi. upstream from the dam, as shown in Fig. 1. The 5-cu. yd. mixer-trucks delivered the concrete at the rate of about 20 yd. per hr.

At the batching plant, shown in one of the photographs, is an aggregate hopper belt conveyor and aggregate bin. The 1½-in. size gravel is weighed after dropping from the left compartment of the bin into a 1-yd. weighing hopper. The center compartment of the bin is for sand, the right compartment is for 1-in. gravel. After each of the two gravel sizes

(Continued on page 190)

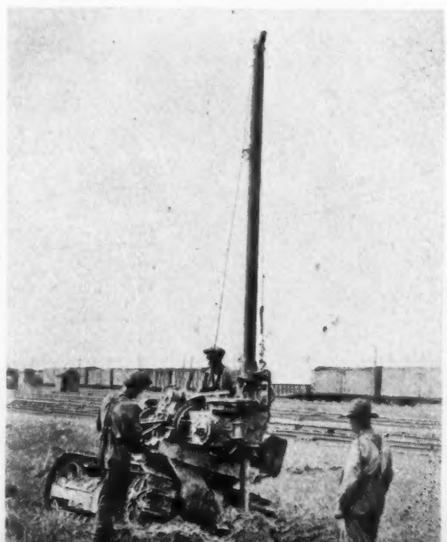
Tractor-Mounted Equipment

Speeds Placing of Telegraph Poles

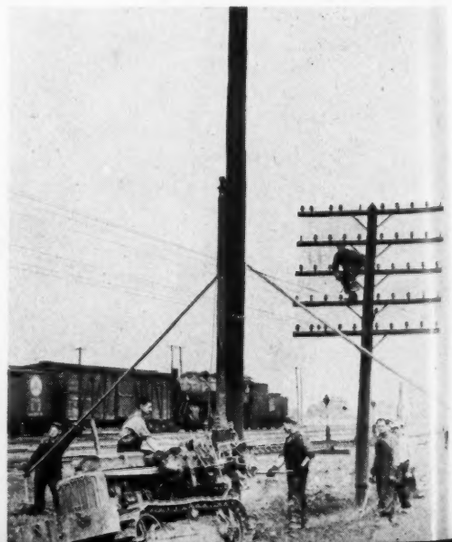
AN EARTHBORING AND POLE-SETTING unit mounted on a Caterpillar diesel D2 tractor proved to be a great time saver to Canadian National Telegraphs in replacing an old pole line with new creosoted poles. The machine is reported to dig holes of 16- to 20-in. dia. to depths of from 7 to 10 ft. in practically any kind of soil except solid rock.

Motivated by the tractor's diesel engine through a power takeoff the rig is proving itself to be a valuable piece of equipment while working under adverse conditions. It can be taken to locations which often require difficult travel over ditches, banks, underbrush, marshes, sand, snow and ice.

EARTHBORING UNIT (below) mounted on Caterpillar diesel D2 tractor digs holes for telegraph poles near Belleville, Ont., where old pole line is being replaced with new creosoted poles.



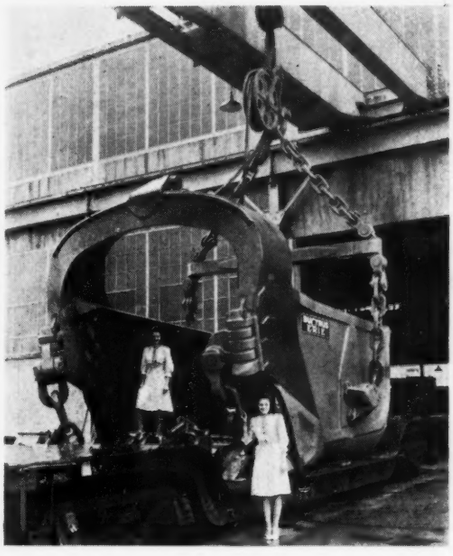
POLE IS LOWERED into hole (below) by cable rigged over steel mast. Winch and earthboring rig are operated by diesel engine of tractor through power takeoff.



JOB oddities

ARTIFICIAL VILLAGE camouflages Boeing B-29 aircraft plant at Seattle, Wash. Fifty-three houses with landscape gardening, highways, sidewalks and trees were built on top of factory as protection from possible air raids. Lawn is made of chicken wire.

Wide World Photo



MONSTER MACHINES are used in coal fields. Record-size, 25-cu.yd. dragline bucket (above), for stripping overburden from Pennsylvania anthracite fields, weighs about 35 tons. It is 13 ft. high from teeth to top of arch; 11 ft. 8 in. wide at maximum outside dimensions; and about 17 ft. long. Part of Bucyrus-Erie dragline excavator which weighs 2,410,000 lb., bucket has 180-ft. boom, can dig 140 ft. deep and can dump 360 ft. from where it digs. Marion power shovel (below) weighs 2,500,000 lb. and towers 10 stories high. Used in coal stripping operations by Commercial Fuel Co., Pittsburg, Kan., its 35-cu.yd. dipper takes 40 tons of dirt at one scoop.

Photos by Bucyrus-Erie and Lincoln Electric Cos.

FIVE THOUSAND GRAPE STAKES are driven by Schramm air compressor to ease manpower shortage in California vineyard.

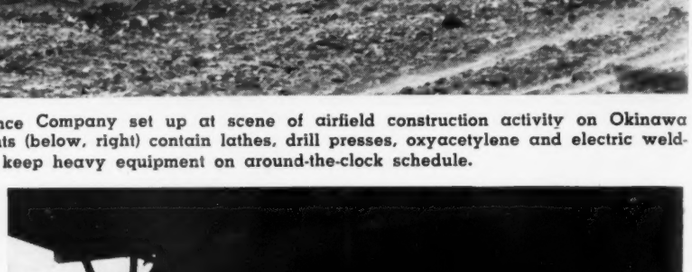
EIGHT-MAN FLAPPER is used by Chinese to tamp earthfill of dike on Yellow River. Ropes 10 ft. long attached to edges of specially shaped 80-lb. stone are pulled high over men's heads. When they let go, stone falls with great force to pack earth tightly. Almost 25,000,000 cu.ft. of earth were solidly tamped by this method.

Authenticated News Photo

REPAIR AND MAINTENANCE FACILITIES (above) of 968th Engineer Maintenance Company set up at scene of airfield construction activity on Okinawa minimize time lost while equipment is deadlined. Mobile repair shops and tents (below, right) contain lathes, drill presses, oxyacetylene and electric welding equipment and foundries for casting otherwise unavailable spare parts to keep heavy equipment on around-the-clock schedule.

ENGINEERS AND SEABEES

Remodel Okinawa



CENTRAL BATCHING PLANT (below) of 1398th Engineer Construction Battalion supplies concrete for projects in 10th Army Area on Okinawa. Excavated ramp permits gravity loading of 55-gal. fuel drums from trailer-mounted, 14-cu-ft. Ransome mixer. Chute consists of two halves of fuel drum pieced together. Truck body is equipped with special rear-end gate, apparently for hauling concrete.

Signal Corps Photos.

BEFORE THE RYUKUS WERE INVADED last Easter at least five Japanese airports on Okinawa and one on nearby Ie Shima were the principal staging points for Nip planes speeding south of the Philippines, Indo-China and the Netherlands East Indies. Okinawa was one of Japan's strongest inner defense bastions and a vital Japanese radar and air patrol base on guard against the occasional hit-run attacks of submarines, surface craft and long range bombers that attempted to penetrate the empire home waters.

Army Engineers and Seabees who came ashore with combat troops in early April of this year completely changed the picture. The six old Japanese airstrips were retained, enlarged and improved while new fields were constructed on all parts of the island. Planes arrived on the island by the hundreds bringing in gasoline, bombs, and Air Corps personnel. Supplies poured ashore and great dumps were built up to make Okinawa the close aerial springboard against Japan that Britain was against Axis-held Europe.

Large-Scale Project—At the time this item was written, 3 months after our

forces landed, airstrips, camp areas and supply dumps on Okinawa occupied an area half the size of Long Island. Airfields stretched out in every direction. Some were all-weather strips with asphalt surfacing on which large silver uncamouflaged Superfortresses landed and taxied to specially prepared hardstandings or parking aprons. Other fields, newly-built but as yet unsurfaced, sent up clouds of dust with every landing and take-off. Some strips were bulldozed out of the bomb-pocked battlefield where our soldiers fought and killed 100,000 Japanese defenders of the island. From the air it appeared that most of Okinawa was checkered with airstrips, camp areas, supply dumps and roads, except for the burned off and shell-scarred hills.

Unusual Progress Achieved—In 3 months, construction work on Okinawa had advanced to the stage reached on Saipan and Guam 6 months after our troops had gone ashore. The Engineers and Seabees worked hard, long hours to achieve such progress. Many of them were wounded by mortar and small arms fire as they drove their bulldozers, scrapers and heavy trucks to areas near the fighting lines.

Equipment Diverted to Other Uses

Although the Nips failed to retard the airfield construction work, the weather succeeded in doing so. Heavy rains during April and May bogged down the entire island necessitating the diversion of equipment and manpower to the job of keeping roads and supply lines open for troops fighting their way toward Naha. The perfect weather which followed permitted around-the-clock work with heavy-duty trucks jamming the two- and three-lane highways in an endless procession from coral pits to runways. Construction areas were flooded by bright lights at night with no fear of Jap attacks. Our night fighters were on guard overhead, and daily raids on Kyushu kept the Jap airfields pretty well neutralized.

Deciding Factor in War—It is now apparent that Okinawa-based planes plus B-29's based in the Marianas and thousands of carrier-based planes forced the early surrender of Japan.

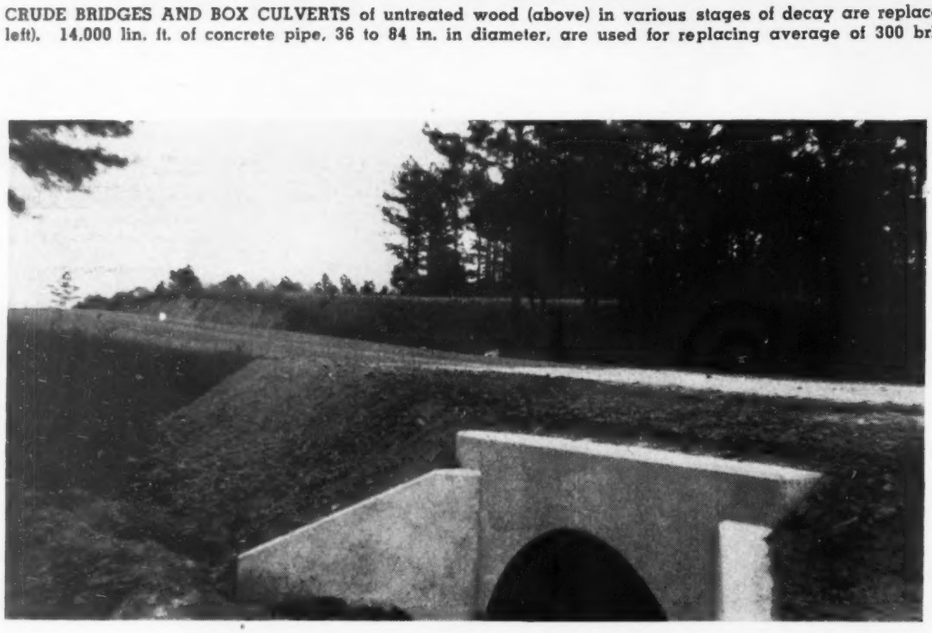
WOOD CRIBBING APPROACHES to lone remaining concrete span of war-damaged bridge at Gaqusuku, Northern Okinawa, shorten travel distance over alternate route by ½ mi.

NATIVE WORK DETAIL uses ancient methods in constructing drainage ditch at Signal Intelligence Section area at Tenth Army base on Okinawa.

CORAL FROM NEARBY QUARRY (below) operated by 1160th Engineer Construction Group is trucked over specially built roads to Machinato Airfield for runway and taxiway base construction.

STATE HIGHWAY DEPARTMENT MAINTAINS

CRUDE BRIDGES AND BOX CULVERTS of untreated wood (above) in various stages of decay are replaced with concrete pipe and metal arch culverts (below, left). 14,000 lin. ft. of concrete pipe, 36 to 84 in. in diameter, are used for replacing average of 300 bridges per year.



NEW TWO-LANE STRUCTURE with 10-ton capacity replaces old single-lane covered bridge, and dangerous approach curves are eliminated on stretch of secondary road in Randolph County, N. C.

MAINTENANCE OF BRIDGES, as stated before, is handled by bridge maintenance department gangs which live in camp cars to keep the men together, promptly available for transfer to the work. The secondary system has more than 15,000 bridges exceeding 16 ft. in length and several thousand of 4- to 16-ft. length. Because of their extremely bad condition when taken over in 1931, a policy was adopted of using creosoted timber or concrete in rebuilding only the most important worn-out bridges. During the war, of course, this type of reconstruction was out of the question. As a result of gradual improvement, secondary bridges were in reasonably good condition at the beginning of the war. A large number of them were rebuilt with untreated lumber in 1935, 1936, and 1937, but the shortage of lumber and labor since the beginning of the war has made it impossible to continue an adequate bridge repair and replacement program. This condition will continue until it is possible to obtain more lumber than has been available during the past few years.

In many cases where minor repairs are required on bridges the work is done by the regular road section foreman, not by the bridge maintenance department. The repairs, usually found in connection with regular road maintenance work, can be made more economically by the regular section foreman than by a special bridge gang sent to the point involved. All major repairs and rebuilding of these bridges is done, however, by the bridge maintenance crew, a procedure which has worked out most satisfactorily.

Concrete Pipe Plants Operated

At several of the prison camps, throughout the Piedmont and at some points in the eastern section, there are plants for making concrete pipe. They

50,000 Miles of Secondary Roads

IN TWO PARTS . . .

Part 2

By W. VANCE BAISE

State Highway Engineer,
North Carolina State Highway and
Public Works Commission,
Raleigh, N. C.

are strategically located in the various counties, usually in vicinities where either sand or coarse aggregate is available. In some sections of the state both of these materials may be obtained at nominal cost, and with very little haul.

At each pipe plant there are forms to make 15-, 18-, 24- and, in a few cases, 30- and 36-in. concrete pipe. The smaller sizes contain no reinforcement, but steel mesh is used in the 30- and 36-in. sizes. These pipe plants can make use of prisoners on rainy days. Locally made pipe is reasonable in cost as transportation expense is largely eliminated.

Before the war, 175,000 to 200,000 ft. per year of various sizes of pipe was produced. Most of the plants are in operation today, but production has fallen off because of the labor shortage and other difficulties.

Wooden Boxes Replaced

In 1931 literally hundreds of thousands of wooden boxes were used as drainage structures on secondary roads. Since that time boxes have been replaced with pipe culverts as rapidly as funds could be provided. The relatively few wooden boxes still in place are rapidly being eliminated.

For a number of years, the commission also has been replacing small wooden bridges with large pipe culverts and, in some cases, arch culverts. During the last year, in three districts which make up one division, 155 wooden boxes were replaced with 8,959 ft. of pipe culverts. This figure is somewhat greater than the normal replacement use of concrete pipe. It can be reasonably estimated, however, that during the last 10 yr. 300 bridges per year as an average

(Continued on page 107)

REBUILDING AND MAINTENANCE of 15,000 bridges more than 16 ft. in length on secondary roads in North Carolina have been handicapped during war years by material and labor shortage. Here steel trusses are placed on piers of old bridge.

Annual Improvements in Miles, 1939-1941
North Carolina Secondary System

Year	Graded and Drained	Soil Surfaced	Stone Surfaced	Bituminous Surface Treatment	Sand Asphalt	Portland Cement Concrete
1939	130.4	216.1	455.2	172.4	3.3	4.8
1940	212.7	293.8	251.7	272.4	22.7	1.5
1941	271.9	475.6	673.4	184.4	38.7	0

I-BEAM BRIDGE with wood floor and railings built by bridge maintenance department replaces covered timber trusses constructed about 1860 over the Neuse River east of Clayton, N. C. Old rubble masonry piers are used in new structure.

REMOVAL OF STEEL starts with 95-ft. suspended portion of 400-ft. cantilever main span, here stripped of roadway, sidewalks and railings in preparation for lowering by hand winches. Overhead cable of ¾-in. plow steel serves as trolley system for removing roadway materials. Workman at left is attaching steel clip to temporary preformed wire-rope hanger in end panel of cantilever arm.

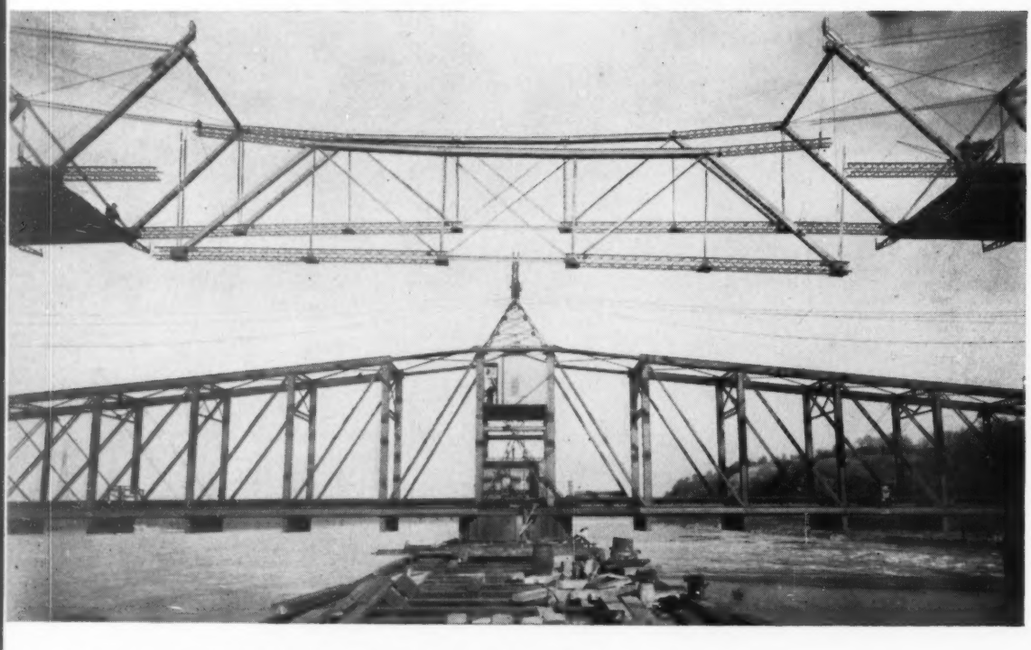
Small Demolition Crew Razes

Nine-Span Bridge

By E. J. SOSHNIK, Structural Engineer, M. E. Souther, Inc., St. Paul, Minn.

PROBLEMS ENCOUNTERED and methods used in removing an old nine-span wrought-iron bridge over the Mississippi River at Dubuque, Iowa, are typical of several such salvage jobs handled by M. E. Souther, Inc., contractor, St. Paul, Minn., for whom the writer acts as engineer in charge of the work. Pier removal on these jobs was performed by the LaCrosse Dredging Corp., Chicago.

Dubuque Bridge—Six of the nine spans in the Dubuque bridge were over water. A cantilever-type main span was 400 ft. long; of the other five spans over water, two were 250 ft. in length and three were 225 ft. Three spans over land were about 115 ft. each, giving the bridge

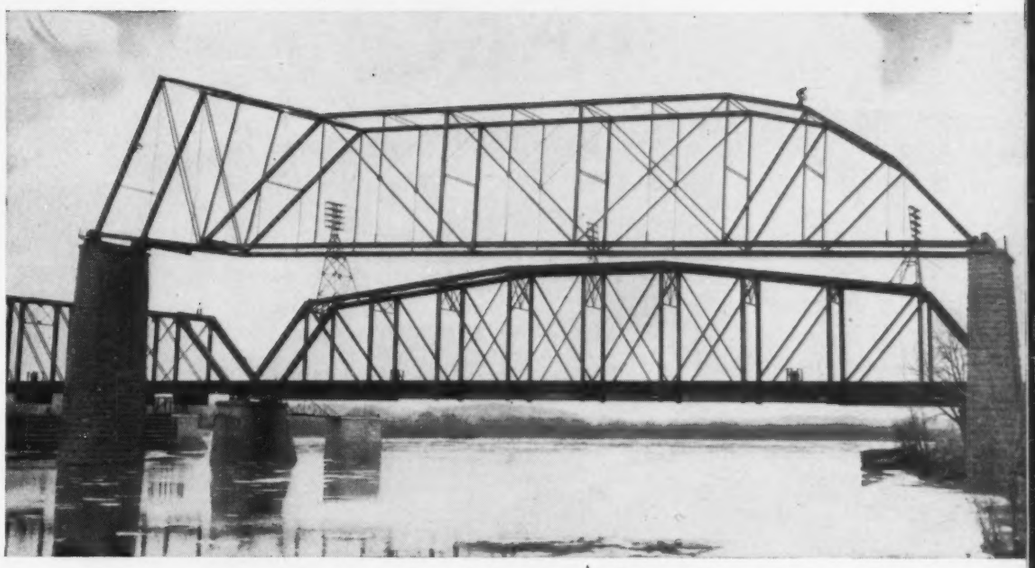


TRUSS IS LOWERED (left) on brakes of hand winches (by wire ropes reeved through sheaves on jibs fastened to diagonals in end panels of cantilever arms) to fender of Illinois Central R.R. swing bridge to be taken to shore by barge and derrick boat. (Above) Close-up of winch and jib used in lowering one end of truss. This section of bridge is salvaged for re-use as simple span.

an overall length of slightly more than one-third of a mile. The roadway was approximately 17 ft. between curbs. Wooden sidewalks, 5 ft. wide, were mounted on brackets outside of the trusses on either side of the bridge. Subfloor and stringers were of wood.

Removal Procedure—Removal of a ¾-in. asphalt wearing surface, sidewalks, railings, curbs and floor, comprised the first step in razing the bridge. This work began at the center of the 400-ft. main-span, taking advantage of the downward slope from this point to use an overhead cable track to carry away the material by trolley. Track cable for the trolley was ¾-in. plow steel wire rope.

Two floating derricks and several hand winches were used in salvaging and lowering steel trusses. The contractor specified preformed wire rope and all-steel



250-FT. ANCHOR ARM (below) of cantilever breaks up as it falls into water to be salvaged piecemeal by grappling hooks. Two workmen on derrick boom make cut which permits truss to topple into river. Above is other anchor arm, converted to self-supporting simple span prior to being burned free at one point in each truss to allow span to fall.

STIFF-LEG DERRICK removes trusses from bottom of river. Pieces weighing as much as 10 tons are cut away and taken to shore by barge.

RAILROAD SPAN (below) is lowered by hand winches and removed from right-of-way in less than 1 hr., 50 min., without interference to train traffic. Span is disassembled for shipment to new site.

(rather than cast) clips for greater safety and better performance on these rigs. The derricks were rigged with ¾-in. preformed wire rope, and the hand winches with 9/16-in. For the latter units, 2,400 ft. of wire rope was required.

The first metal to be removed was the 95-ft. suspended portion of the 400-ft. main cantilever span. The two trusses were lowered one at a time into a derrick boat of the LaCrosse Dredging Corp. and were taken to shore.

Two 250-ft. spans and three 225-ft. spans were dropped into the river. The salvage job on these consisted of raising

(Continued on page 164)

GASOLINE HOSE 18 ft. long on self-winding reel eliminates "jockeying" car into position at Shell's "Service Station of Tomorrow." Pumps are 2 ft. shorter than present ones. Salesroom adjoining service room is glass-inclosed on two sides and designed for display and sale of many automotive and non-automotive items, including a number of small electrical appliances.

Functional Design

Is Feature of "Service Station of Tomorrow"

FUNCTIONAL DESIGN, involving structural simplicity and operating workability, rather than architectural ornateness, is the basic principle embodied in the "service station of tomorrow" exhibited by the Shell Oil Co. last month in the form of a model erected at its waterfront depot in Brooklyn, N. Y. The result of two years of research, including a survey of the opinions of 180,000 motorists and consultation with Norman Bel Geddes, J. Gordon Carr and other industrial designers, the structure decided upon as a standard will occupy a ground area of about 100x100 ft. and will cost about $15,000 to construct. The building of these stations, several hundred of which will be completed next spring, will be done by contract. The station is designed for operation by three men. Each station comprises a service room and a salesroom for both automotive and general merchandise, including small electric appliances.

Impervious materials, such as glazed brick, tile, smooth plastic, glass blocks, pressed blocks or porcelain enamel sheets, will be used outside and inside to provide great durability and make the station easy to keep clean. For uniformity and economy in construction, the company is contemplating prefabrication of several important parts of the station.

The new gasoline pump stand is only 54 in. high in order not to block the customer's view of the salesroom. The sales-recording device is at eye level. The pump contains a built-in self-winding hose reel which the attendant can unwind to reach motorist's car without need for "jockeying" into position. Hose is 18 ft. long. The approaches are designed to facilitate entry and exit of cars without blocking traffic. All maintenance equipment is mobile.

The 100x100-ft. station yard provides 14 to 18 ft. between the building and the pump island and 10 to 14 ft. between pump island and sidewalk. There is parking space for 8 to 12 cars. The building will be 46x30 ft. in plan. Two service bays, one for lubrication and one for washing, will be 27x30 ft. and the salesroom 324 sq. ft.

SERVICE ROOM is laid out so complete lubrication job can be done without moving more than six steps from car, cutting one-third from time required for most service jobs.

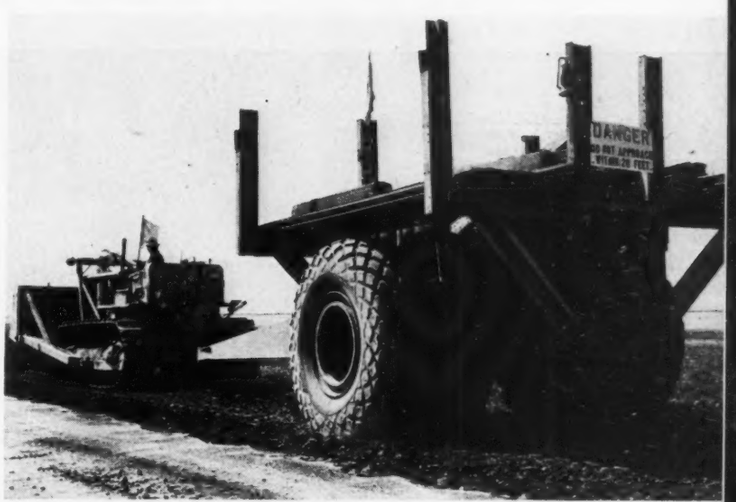
Giant Rollers COMPACT AIRFIELD SUBGRADES

GIANT SHEEPSFOOT ROLLER, attached to tractor, climbs out of compacted subgrade. Steel feet 18 in. long with diamond-shaped pads are welded to surface of 8-ft.-dia., 10-ft.-long drum.

RECONSTRUCTION OF MANY AIRFIELDS has been made necessary by the greatly increased size and weight of military aircraft. To rebuild these fields for safe support of the very heavy wheel loads of the new super planes at minimum cost, the Sacramento District, Corps of Engineers, U. S. Army, developed a giant sheepsfoot roller to determine whether a 21-in. thick layer of subgrade could be compacted in place in one operation.

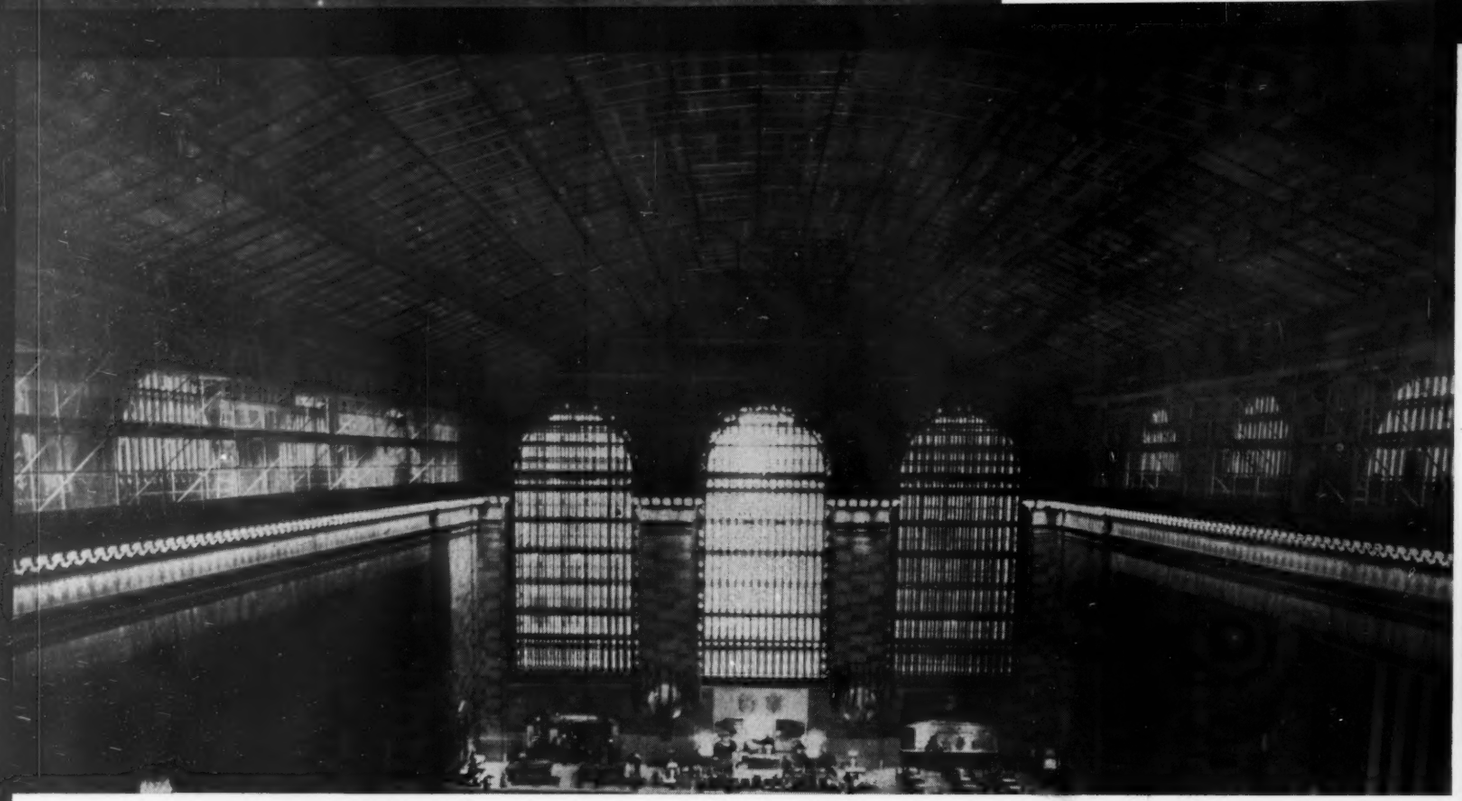
Sheepsfoot Roller—With compaction equipment customarily used on road and airport work, a 6-in. thick layer of material is about the maximum that can be compacted at one time. Four lifts would be required for compaction of 21 in. The roller built by the Sacramento Engineers to cut this down to one operation has a steel drum 8 ft. in diameter and 10 ft. long. As originally built, it had 48 steel feet welded to the surface of the drum. These feet were 18 in. long with diamond-shaped pads 2½x5 in. for contact surfaces. The drawbar was attached to a rectangular box-girder frame around the roller and the frame was suspended from the axle of the drum. The entire roller, as originally constructed, weighed 26,600 lb. With the drum filled with water, this weight was increased to 58,000 lb., while filling with wet sand in place of water

(Continued on page 180)

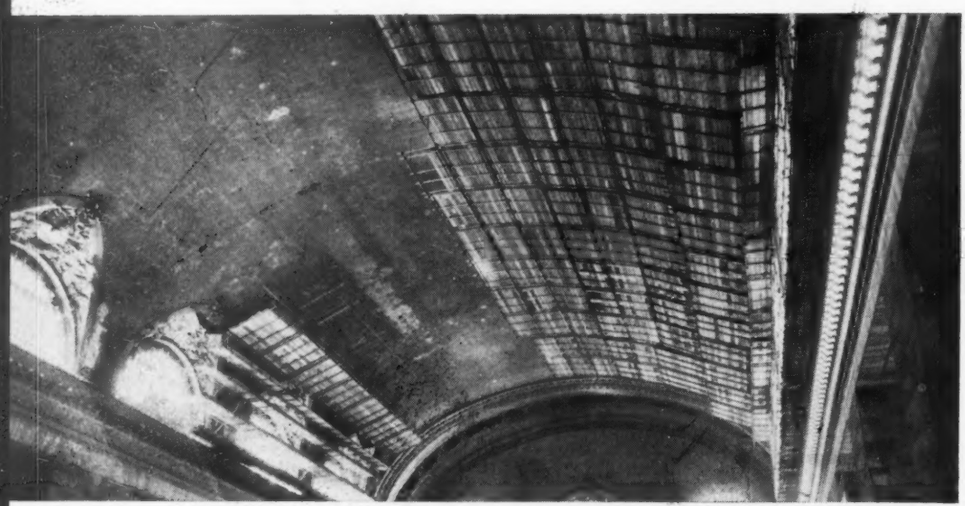


UPPER 6-IN. LAYER of subgrade is compacted by heavy rubber-tired roller towed by D-8 tractor. Roller consists of steel boxes bolted together with axle protruding from side of each box.

MAMMOTH FRAME and huge tires nearly 10 ft. high of 150-ton roller (below), heavily loaded with iron weights, dwarf two men at Merced Army Airfield where unit tests sub-base after normal compaction.



SUSPENDED SCAFFOLD rising 112 ft. above floor conceals 275x120-ft. arched ceiling of main concourse in Grand Central Terminal from view of travelers below, providing complete protection during renovation of ceiling.



PROGRESSING OUTWARD from tubular pole-type scaffolds at two sides of ceiling, workmen extend steel pipe framing of suspended scaffold from hanger to hanger and cover each erected bay with planking previously treated for fire resistance.

Photos from Brown Brothers

UPON CONTINUOUS PLATFORM (below) of fire-resistant planks resting on tubular steel framing, suspended by wire-rope hangers from roof steel, artisans find safe and convenient working space for resurfacing and painting vast arched ceiling.

Suspended Scaffold

BLANKETS GRAND CENTRAL CEILING

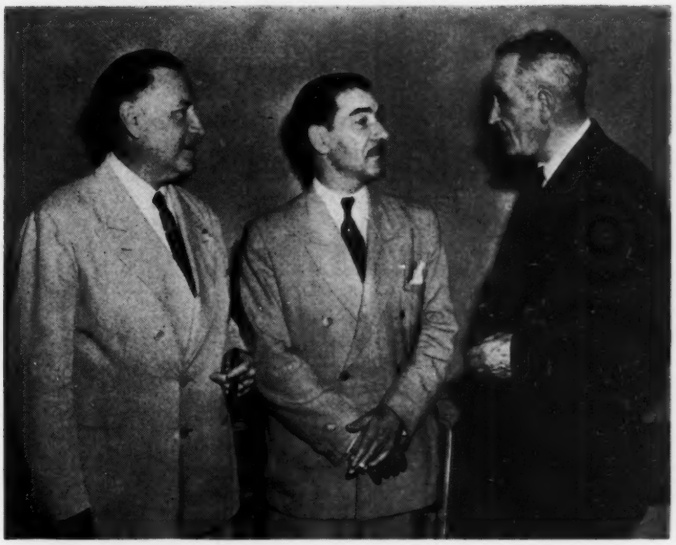
TO PROVIDE A CONTINUOUS PROTECTIVE CANOPY and working platform for redecoration of the 275x120-ft. arched ceiling of the main concourse in Grand Central Terminal, New York, the Chesebro, Whitman Co., Inc., contractor, Long Island City, erected a suspended scaffold which hung a uniform distance of 6½ ft. below the vast ceiling and rose at its highest point 112 ft. above the floor. Said to be the largest scaffold of its kind ever built in the United States, the extensive installation went up in less than two months, almost without attracting any attention from travelers on the floor below. Working quietly at night, the contractor suspended a frame of Tubelox steel pipe and couplers on 600 ½-in. wire-rope cables from the roof steel of the building and covered the tubular framing with treated "Firesafe" plank. About 6,000 fire-resistant planks, 1¼x9 in. x13 ft. long, were laid on the

(Continued on page 188)

Present and Accounted For... A PAGE OF PERSONALITIES

NEW INSPECTOR GENERAL of Army is LIEUT. GEN. DANIEL I. SULTAN (right), former engineer commissioner of District of Columbia. First four-time recipient of Distinguished Service Medal, Gen. Sultan is presented with third Oak Leaf Cluster by GENERAL OF THE ARMY GEORGE C. MARSHALL (left), Chief of Staff. Since last October, Gen. Sultan had commanded India-Burma Theater.

U. S. Army Photo



BRAZILIAN HIGHWAY ENGINEER studies planning, construction and maintenance methods in United States. Conferring in Washington with CHARLES M. UPHAM (left), engineer-director, American Road Builders' Association, and COL. MAURICE E. GILMORE, head of transportation department, Office of Inter-American Affairs, is CARLOS DA SILVEIRA LICHTENFELS, engineer, maintenance division, State of Sao Paolo, Brazil. He reports that Sao Paolo plans $16,900,000 highway program during next five years.

NEWLY ESTABLISHED CONSTRUCTION DIVISION of U. S. Department of Commerce is headed by JOHN L. HAYNES, former director of construction bureau of War Production Board. He will collect data for comprehensive picture of construction industry.

NEW AVIATION DIVISION of The Austin Co., Cleveland engineers and builders, is headed by W. R. ENGSTROM, company vice-president, who has been district manager in Pacific Northwest since 1933. He directed all work on $85,000,000 Navy contract.

NEW AIR ENGINEER in Army Air Forces headquarters at Washington D. C., is BRIG. GEN. JAMES B. NEWMAN, JR., who organized 9th Engineer Command in European Theater, which built 273 landing strips and major airfields between D-Day and VE-Day. Gen. Newman also directed construction of Washington National Airport.

Army Air Forces Photo

←

REHOUSING WORK IN GERMANY will be aided by LEONARD E. BROWNSON, JR., president of Purdy & Henderson Co., of New York and Havana, Cuba, as deputy chief, Building Materials and Housing Branch of Economic Division of U. S. Group Control Council for Germany.

→

ENGINEER COMMISSIONER for District of Columbia is BRIG. GEN. GORDON RUSSELL YOUNG, former commanding general of Fort Belvoir, Va. He served for two years as Engineer Officer of Panama Canal Department.

Signal Corps Photo

CONSTRUCTION METHODS — Page 113

THE GERMAN ECONOMIC PEACE HARD, SOFT... or WORKABLE?

IT is not surprising that difficulties are being encountered in spelling out the detailed terms of the German economic settlement.

The problem is exceedingly complex. The German economy is more or less inextricably bound up with the economy of continental Europe. Before the war that area—excluding the United Kingdom, Ireland and Russia—accounted for approximately one-fourth of the world's production, and for more than thirty-five per cent of world import and export trade. Germany's production constituted almost one-third of the output of continental Europe. It is obvious that the decisions we make now concerning the future German economy will exert profound influence not only upon the economy of Europe but also upon that of the world. It is clearly not practicable to plan for an expanding world economy unless provision is made for Europe generally to share in the development.

Despite the magnitude and complexity of the problems involved, it is crucial that we and our Allies come to swift and decisive agreement. Such agreement is important both to world economic reconstruction, and as a demonstration that those who won the war can reach accord on the terms of world economic rehabilitation.

We shall accomplish little if we continue to debate in terms of *adjectives*. Yet most of the public discussion to date has centered around whether or not the economic settlement with Germany should be *hard* or *soft*. To make progress we must focus instead upon *objectives*. A good program is one that will promote our objectives—a bad program is one that will not.

What Are We Trying To Accomplish?

Upon the economic objectives of the German peace settlement there is little fundamental debate. This is demonstrated by reference to a number of documents of recent release—the United States Directive to General Eisenhower of April 1945, the Report of the Tripartite Conference at Berlin of July, the Report of the American Advisors to the Office of Military Government of September. The latter document stresses fundamental difficulties in developing a practical program for carrying out the objectives of the other two, but it does not question their formulation of aims.

What are the objectives that we are seeking to forward:

1. The disarmament of Germany.

2. The elimination of German industries devoted primarily to armament production.

3. The assessment of reparations to compensate those nations which have suffered losses from German aggression through direct war destruction and through the German policy of confiscating industrial equipment to her own use.

How Far Are We Agreed on Procedure?

There is also a wide measure of agreement upon detailed procedure for carrying out these objectives. No one, of course, questions the policy of confiscating German arms. Equally, there is agreement that German industry devoted directly to the production of war equipment should be confiscated or destroyed, and that control measures should be instituted and sustained to prevent her from reconstituting such industries in the future. Since it is not practicable to prevent aircraft production and shipbuilding from being diverted to military use, these industries are included in the armament category. And similar reasoning generally extends the list of prohibited industries to ball bearings and abrasives.

There is an additional category of German production which all of the Allied powers agree should be uprooted and permanently barred. It embraces all economic activity which prewar Germany cultivated on an uneconomic basis through subsidy and other protection for the prime purpose of developing a self-sustaining economy to support aggressive war.

The major elements in this category are not difficult to define. A great German industry for the synthetic production of gasoline and other oil products from coal never operated upon an economic basis. The cost of such fuel products to prewar Germany averaged almost four times what it would have cost her to buy petroleum products in the world market. It is doubtful whether these plants could be operated postwar at a cost much below three times the world market price for competing petroleum products.

A similar situation applies to German synthetic rubber production. In an attempt to free herself at least partially from dependence upon supply lines, she produced synthetic rubber at a cost at least double the world market purchase price. Similarly, she protected or otherwise subsidized a considerable agricultural production, particularly in grains, for which her lands were so ill suited that Germans had to pay for German-grown wheat from three to four times the world market price.

These are merely outstanding examples. The maintenance of such activities in Germany constituted a drain upon the German economy rather than an advantage other than that of preserving a self-sufficiency necessary for war. Hence their elimination is clearly indicated, and generally subscribed to, though the job of defining a complete list is far from easy.

What Is The Area of Dispute?

Unfortunately, this total catalogue of agreed-upon measures is not sufficient to provide either adequate security against a resurgence of German militarism or satisfactory restitution to her European neighbors for Germany's ruthless destruction of their industrial plant and equipment. To serve these two ends it is necessary to cut down the margin of German dominance in heavy industry—in steel, in electric power, in machine tools, and other industrial equipment. Unless such steps are taken, Germany will emerge from the war with sufficient industrial power to provide a continuing and perhaps uncontrollable military threat; and we should be perpetuating a dominance that was developed, as a matter of German strategy, far beyond the requirements of her civilian domestic markets or the export potentials of normal trade.

German steel capacity was built to a wartime peak of twenty-four million tons a year. Before the war she had accumulated a store of machine tools greater than that of the United States, and her present stock of some four or five million tons of such tools is second only to ours. There is little debate over the necessity and justice of cutting down the margin of German dominance in heavy industry, particularly since it was built to its current levels through aggressive economic warfare to serve as an instrument of actual warfare. It is recognized, too, that in this sector of the German economy will be found the most useful reparations in kind for the countries damaged by German aggression.

The question is how much heavy industry and electric power equipment should be taken from Germany and transferred to others. The Russians, having experienced colossal war damage, are demanding very severe assessments. They talk of reducing postwar German steel capacity to three million tons annually.

The United States inclines to assessments in this field of less extreme dimension—we have suggested leaving in Germany an annual steel capacity of from seven to ten million tons. We naturally are concerned lest action be taken that will cause a complete breakdown of the German economy. If this should happen while we maintain occupational forces there, we should feel responsible for seeing that the Germans within our jurisdiction are provided with at least the means for subsistence. Furthermore, both we and the British know that in the long run our peoples will not support control measures over Germany which go beyond our concepts of reasonable fairness consistent with security requirements.

It is no part of our intention, as has been suggested by some, to provide for a German economy that will serve as a buffer against Russian expansion. We know, however, that our weakest course would be to commit ourselves now to continuing control measures which our people would later repudiate as falling outside democratic concepts of justice. On this issue we cannot, and should not, compromise.

How Can We Resolve Our Differences?

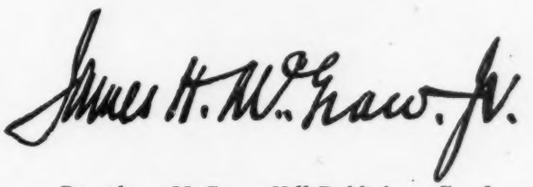
The best chance for resolving the differences which have appeared between the Russian position on the one hand and the American and the British position on the other lies in making a sharper distinction than has appeared in current discussion between long-term and short-term control decisions. All of us are agreed upon the policy of wiping out German military production and that part of German economic activity which has been run at economic loss to provide for a national self-sufficiency useful only for war purposes. But we are unwilling to enter into long-term commitments for holding down those parts of the German economy that do not constitute a war threat. That would unduly penalize future generations of Germans and drag down the whole economy of continental Europe.

It should be possible to reach agreement that measures for cutting down German heavy industries and power-generating facilities are immediate measures, and that no attempt will be made to sustain such controls over an extended period. If part of the German establishment in these fields is transferred to countries whose manufacturing resources have been damaged by German aggression, it can serve the purpose of effecting a reasonable balance without destroying utterly incentives for a new generation of Germans to improve by peaceful methods their status in a peacetime world.

Such a program is consistent with the concept of building a healthy and balanced European economy in which general economic interdependence provides one of the essential safeguards against a resurgence of German militarism. We must still face the problem of agreeing upon how far the non-armament segments of German industry can be cut back at the present juncture without leading to disastrous breakdown with its resultant chaos. Such definition, though formidably difficult, should not be beyond the capacities of the nations whose combined might brought victory, and who have the strongest of incentives for devising a lasting peace.

The key to agreement lies in each of us doing his best to understand the position of the other. Russia must recognize that we cannot get our people to subscribe to the permanent repression of a European economy which would deny to millions of people any hope of normal economic betterment. We should try to understand Russia's conviction that she is entitled immediately to reimburse herself for her war losses by drawing upon the German industrial establishment that still exists. It will help to resolve our differences if we separate in our thinking steps that require permanent controls from those which are merely temporary expedients.

Neither of us will be forwarding our ultimate and common objectives if we impose controls that blight the development of so large and important a segment of the world as continental Europe. In such a blight lies the germ of a Third World War.



President, McGraw-Hill Publishing Co., Inc.

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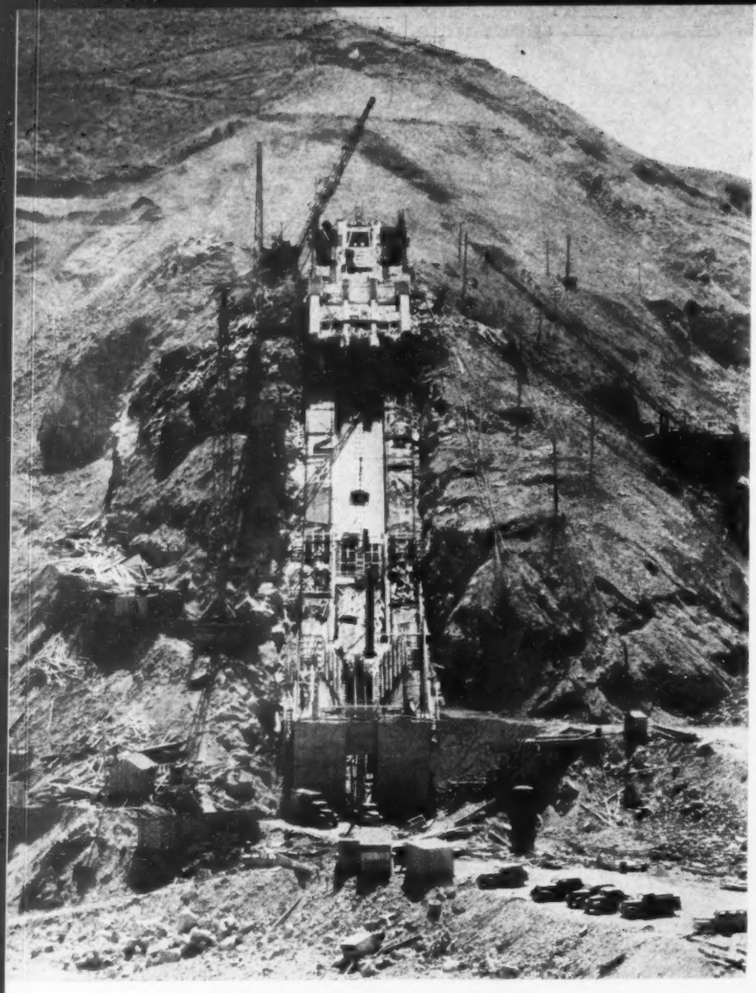
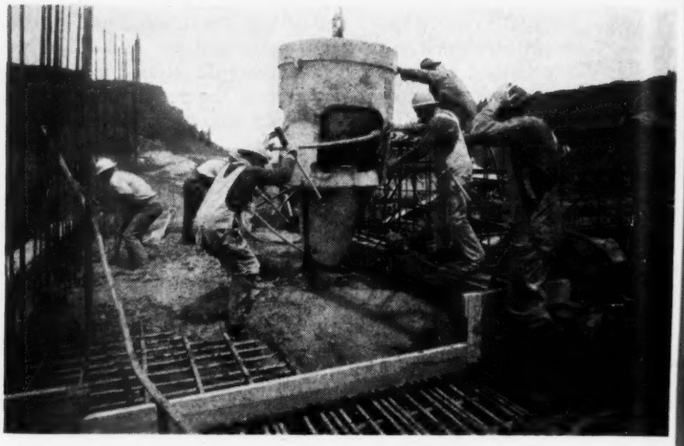
CONCRETE WORK ON *World's Highest Earthfill Dam* NEARS COMPLETION



OUTLET WORKS CONSTRUCTION IS RUSHED to permit storage of 45,000 acre-ft. of water by next spring. Flow through 20-ft.-dia. outlet tunnel will be controlled by 15x30 ft. fixed-wheel bulkhead gate.



CONCRETE FOR HEAVILY REINFORCED floor is poured as one of final phases of outlet works project. Machinery for operating mammoth control gates will be housed on this floor.

UNDER STRESS OF THE WAR FOODS PROGRAM, storage facilities for at least 45,000 acre-ft. of water are to be provided at Anderson Ranch Dam, in southwestern Idaho, by next spring. In day and night work on this project the U. S. Bureau of Reclamation and the Morrison-Shea-Twaits-Winston Co., contractors, employ more than 700 men. R. J. Newell is acting regional director for the Bureau.

Final Phase of Concrete Work—Construction of the outlet works of the world's highest earthfill dam is one of the final phases of concrete work on the project. A major portion of the permanent 20-ft.-dia. outlet tunnel is now being used to divert the South Fork of the Boise River past the damsite. Remaining concrete work includes construction of the powerhouse and spillway. The spillway will be an open-channel, concrete-lined chute, 53 to 100 ft. wide and 339 ft. high having a maximum discharge of 20,000 cu.ft. per sec.

Final Height 456 Ft.—When completed the project will have a storage capacity of 500,000 acre-ft. of water. The dam will rise 456 ft. above lowest bed rock, will be 2,500 ft. wide at

(Continued on page 156)

CONVEYOR BELT SYSTEM FROM MAIN BORROW PIT (below) carries material 1¾ mi. to site of world's highest earthfill dam on South Fork of Boise River in southwestern Idaho. Material is added to dam enbankment at left which when completed will contain 8,650,000 cu.yd. of earth and rock. Rock-surfaced portion of dam in foreground is downstream face to right of which is outlet tunnel. Spillway site is from outlet tunnel to conveyor trestle, above. At right, zig-zag "Burma Road," above shop buildings and warehouses, provides principal access to 1,000-ft. deep canyon.

TIMKEN ROCK BITS nip drilling costs at Ross Dam

Ross Dam under construction.

Timken Rock Bits are being used 100% in the construction of the second step (185 feet) of Ross Dam.

Ross Dam is being built by a leading northwest contracting firm for the City of Seattle. It is part of that city's great hydro-electric power project and is located on the Skagit River in northern Washington.

The dam is being constructed in three stages or steps. The first step (290 feet) was completed in 1940. The second step (185 feet) should be completed in 1946. The third step (100 feet) will finish the job.

Transportation is one of the heaviest items of rock drilling cost on this project, but Timken Rock Bits have effected gratifying savings for the contractor by consistently reducing transportation and nipping costs and cutting drilling time.

This contractor — and scores of others — have proved it pays and pays well to use Timken Bits. Are *you* using them? The Timken Roller Bearing Company, Canton 6, Ohio.

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Fraudulent Wallboard

"A certain salesman came into my office just 3 months and 5 days ago with a proposition to sell me $5,000 worth of a special wallboard which I needed in a hurry," Tractor Conn explained. "We signed a contract to that effect, which was one of his own writing and make."

"I suppose you just glanced over it, noted dates and such, and took the rest for granted," Conn's attorney interposed.

"No, that part of it was all right, I made certain of that," Conn assured him.

"Did he deliver within the time specified? And was the wallboard up to specifications in every way?"

"It was."

"Well, what do you want of me?"

"What do I want of you? That salesman made me believe he was the only guy on the road who could sell that type of wallboard or anything like it. I've found that I could have bought it in dozens of places 10 percent cheaper," Tractor Conn exploded.

"Then I suppose you want me to enter suit against the jobber for damages?"

"Yes, that's what I want, but as far as I can see it is impossible. There's a clause in the contract that I failed to read," Conn admitted, "a clause that prohibits me from entering suit for 6 months after the date of the contract."

"If that's all, you have nothing to worry about," the lawyer consoled, removing a large volume of reports from a nearby bookcase. "Here it is—Granlund vs Saraf, 160 N.E. 408, where the Court said: 'Attempts under the form of a contract to obtain total or partial immunity from liability for fraud are all under the ban of the law. The extent of the relief granted to the injured party, in order to be adequate, cannot be restricted by the act of the parties.' "

"I'm luckier than I deserve," Tractor Conn agreed.

The Case of the Premature Work

"Provided, however, that the said Tractor Conn shall not be bound nor required to do the work herein specified nor part thereof for which funds to pay for the same have not first been made available by a tax levy according to law," a Colorado contract provided. The money was not made available by the tax levy, and Tractor Conn knew this, but he began work without demanding that this provision of the contract be carried out.

Then Tractor Conn ceased work, and he and his sureties were sued for breach of contract.

"Until the money was made available by tax levy, according to the contract I was justified in stopping work at any time," Conn contended.

"When you began work without insisting on that condition you waived it," the other party contended. The point came before the Colorado Supreme Court in a case reported in 225 Pacific Reporter, 261, and Tractor Conn lost.

"Assuming that this clause with reference to a levy constitutes a condition precedent to the taking effect of the contract it certainly could be waived by Tractor Conn by beginning work either without insisting upon performance or without stopping to inquire whether the condition had been complied with," said the Court, in ruling against Tractor Conn.

The Case of the Missouri Tax Bills

A Missouri city made a contract whereby Tractor Conn was to do certain city work which was a special lien on the property of the adjoining owners. The city was authorized to issue special tax bills against the property receiving the benefit of the improvements. These tax bills were issued to Conn in payment for his work. The contract under which he was to do the work provided that it should be completed within a certain time and that time should be of the essence of the contract. Conn failed to complete his job within the required time, sued on his tax bills, and the Missouri Courts ruled that they were invalid.

"This rule is for the protection of the property owner, and is based on the fact that 'the ability of a city to create a lien on the property of the abutting landowner, for street improvements made in pursuance of the provisions of the ordinance authorizing the same, is not founded on any pre-existing right, but exclusively on substantial adherence to the method prescribed by such ordinance,' " said the Court.

More Legal Adventures of Tractor Conn Next Month

Contractors: HERE'S HOW TO BUY THE CONSTRUCTION EQUIPMENT that you need!

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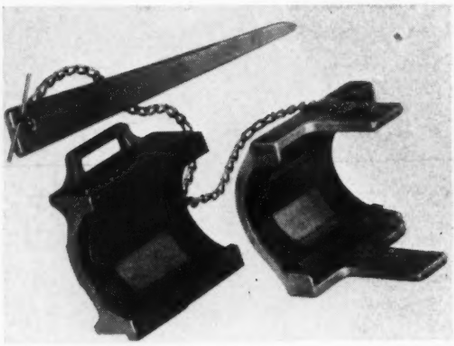
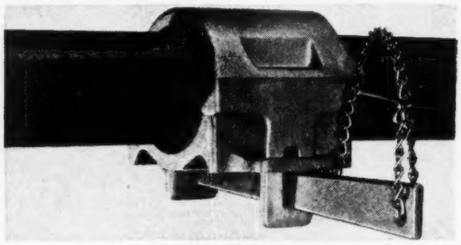
CONSTRUCTION EQUIPMENT NEWS

NOVEMBER, 1945 REVIEW of Construction Machinery and Materials





FLEXIBLE PIPE COUPLINGS, known as Presto-Lock, said to permit faster coupling of pipe at lower cost and with greater flexibility may be used with any plain pipe without groove threads, or flanges. No wrenches or special tools are required for assembly, only a hammer being needed to tighten wedge keys after the two sections are fitted over pipe ends and wedge keys have been inserted in the key channels. Three parts of couplings are: two corrosion-resistant malleable iron castings and the quick-lock wedge key. Sizes 1¼, 1½, 2, 2½ and 3 in., are equipped with one wedge key and chain assembly to prevent loss of coupling parts. Sizes 4 to 16 in. have two wedge keys but no chain assembly. Specially designed gaskets affect a permanently tight seal on all types of pipe lines. Three types of gaskets are available: synthetic rubber, neoprene and natural. Tests by manufacturer show that Presto-Lock couplings give up to 40 deg. flexibility at each joint, acting as sleeve, elbow and ball union at all times. May be used for repairing any size leak that the coupling will cover and will withstand all normal working pressures of gas, steam, oil and water.—**Drinkwater, Inc., 2323 S. Michigan Ave., Chicago, Ill.**

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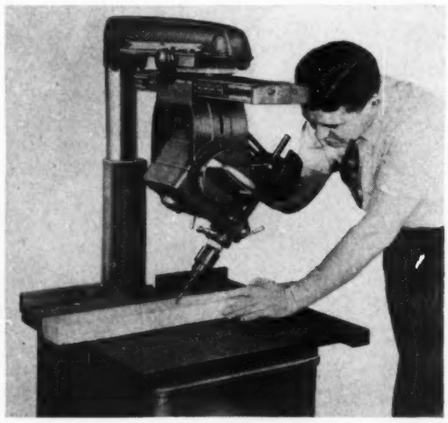

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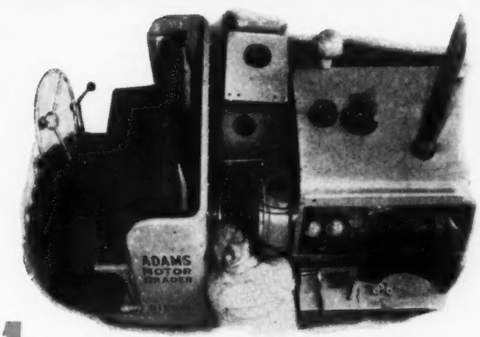
NEW WHEEL-MOUNTED SHOVEL-CRANE is ½-yd. machine with lifting capacity of 6 tons, overall width 8 ft., wheel base 7½ ft., and overall weight when equipped as shovel 26,350 lb. Is mounted on dual wheels. Features include easy steering by hydraulic power; automatic hydraulic stabilizers

(Continued on page 122)

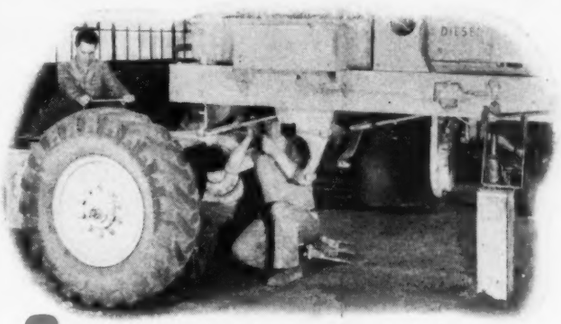
ADAMS

MOTOR GRADERS

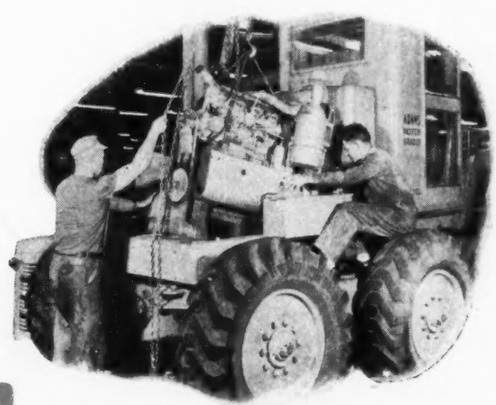
EASY TO SERVICE



1 Clutch easy to reach and service



2 Transmission readily accessible



3 Engine easily removed

● From stem to stern Adams Motor Graders are engineered for fast, efficient, economical servicing. Note the examples pictured—observe how usually difficult-to-reach assemblies are easily accessible in Adams Graders:

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3. If desirable, engine is quickly removable—much easier than on most motor graders.

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Adams

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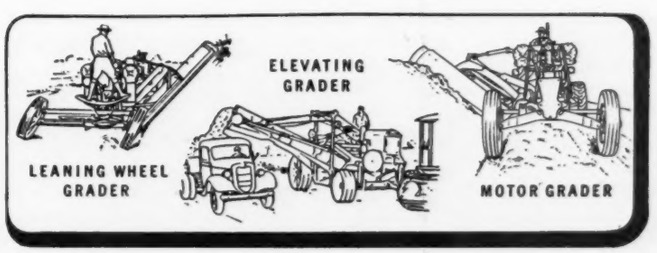

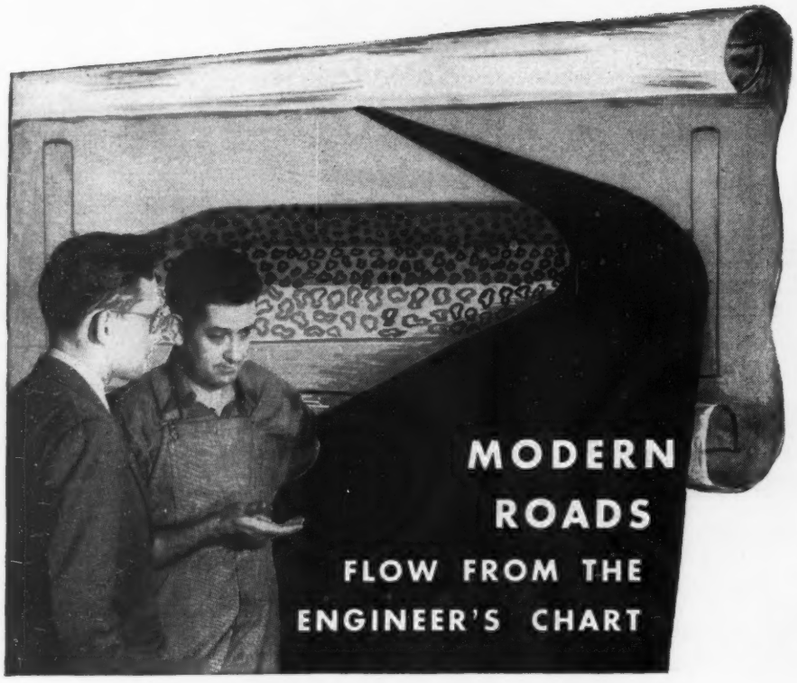

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KOTAL *Master Mixes*
The Advanced All-Weather Aid in Building Better Roads

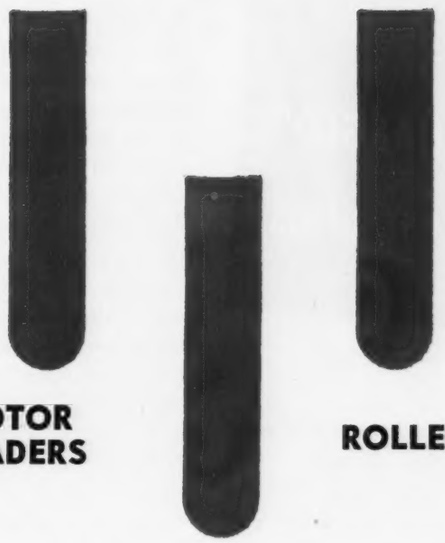
(Continued from page 120)

that lock oscillating front axle in any position and increase stability; equalizing for uneven ground conditions; and power hydraulic brakes to lock machine against involuntary movement while digging. Is easily convertible to all conventional attachments.—**Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.**

★ ★ ★

IMPROVED LATCH FOR SAFETY HOOKS gives 80 percent of full throat opening and its proper operation decreases possibility of overloading and overcrowding. Wider throat opening results from way latch assembly, when open, straddles neck of hook. Load is easily slipped into hook but cannot be removed until operator's fingers release latch, thus preventing risk of dropping loads. If hook is

overcrowded, latch will not snap into place. If hook spreads because of excess loading, latch pops up as warning signal. Made of pressed steel in smaller sizes and cast bronze in larger, latch is riveted at neck of hook to cam which is integral part of hook forging. It is actuated by stainless steel wire spring which coils around hub of cam on each side and extends down inside of latch.—**Thomas Laughlin Co., Portland, Me.**



MOTOR GRADERS **ROLLERS**

With peace coming months ahead of schedule, the problem of reconversion to peacetime economy is a serious one. Having supplied large quantities of motor graders and rollers for carrying on the war, Galion now looks toward tomorrow with confidence. Galion continues to keep abreast of the times . . . continues to develop its broad line of products to meet changing conditions. Watch Galion if you want the latest in road machinery for 1946.

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points to better roads

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: GALION, OHIO

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STEEL IS "HONORABLY DISCHARGED" —and ready for your plans

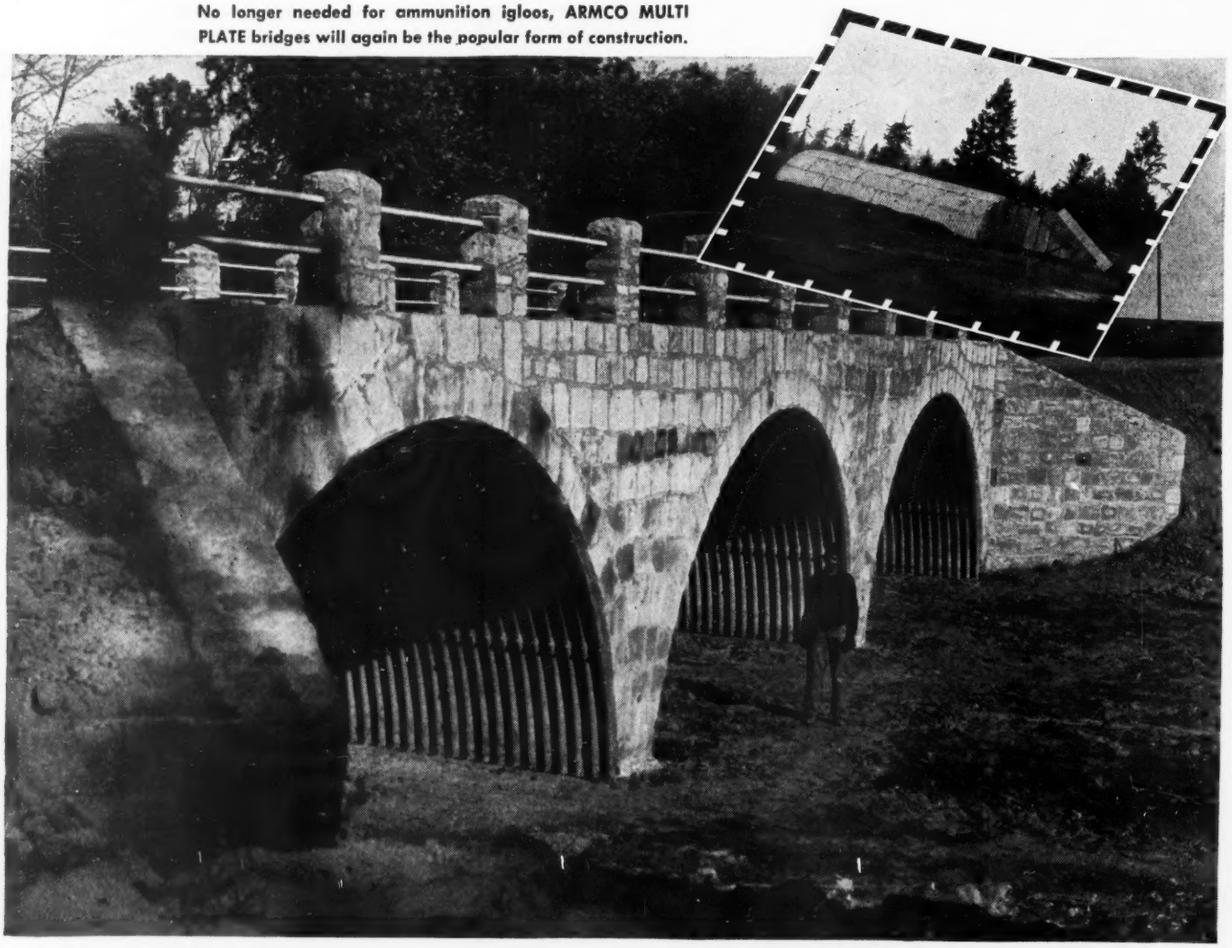
Now it's no longer necessary to substitute less satisfactory products for corrugated metal pipe.

With the war ended in Europe, Asia, and the Pacific, iron and steel have been "honorably discharged" and are again available for your drainage and other needs. During the days of material restrictions and substitutes you will recall how ARMCO Emergency Wood Pipe served a useful purpose. It was another unusual Armco service. But steel, so indispensable for ships, guns, equipment, landing mats, and for portable culverts in the forward areas, is also indispensable for peacetime construction.

Armco products have retained all their desirable features, such as light weight and ease of handling, flexibility and great strength. During their nearly forty years of distinguished service they have consistently proved their durability and saved taxpayers thousands of dollars. Now they are back in improved drainage and other structures—ready to serve you more efficiently and economically than ever before.

For immediate construction or for current and post-war plans, you will find Armco drainage and metal products a wise choice. Order them now or write for further information. Armco Drainage Products Association, 835 Curtis St., Middletown, O.

No longer needed for ammunition igloos, ARMCO MULTI PLATE bridges will again be the popular form of construction.



SCAN THIS LIST

ARMCO products: Corrugated Metal Pipe and Pipe-Arches, Paved Invert and Asbestos-Bonded Pipe, Perforated Pipe, MULTI PLATE Pipe, Arches and Pipe-Arches, Drainage Gates, Spiral Welded Pipe, Steel Sheeting, Retaining Walls, Tunnel Liner Plates, Guard Rail, End Sections.

GET ALL THE FACTS

And You'll Get One of These

3 NEW LORAINS

"41" SERIES

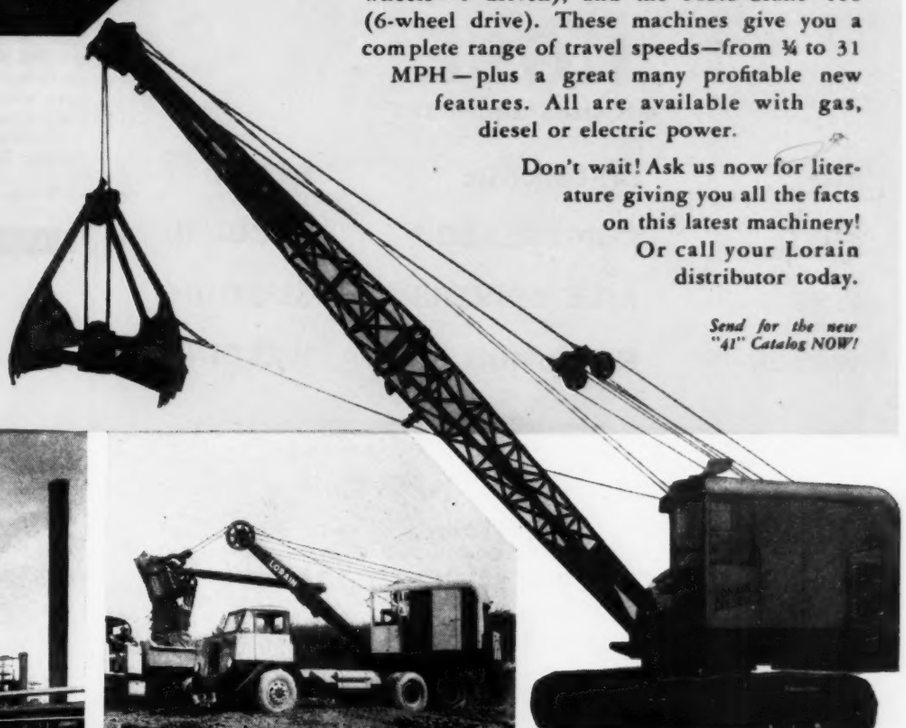
Brilliant new performance . . . greater payload capacities . . . longer, lower-cost service life are ready for you now in the new, tested Lorain "41" Series! All these faster, huskier machines ask of anybody is that *you* get the whole story. They'll bring new, profitable efficiency to your operation . . . change future job figures all in your favor!

Let your Lorain distributor show you where, how and how much these Lorain "41" shovels, cranes, clams, drags and hoes can do. How a new shoe-type swing clutch multiplies service life, gives velvet smooth, lightning fast operation . . . how Lorain convertible front end engineering gives you five potential machines in one—crane, clam, drag, shovel and hoe . . . how a dozen other smart new engineering features make these machines high-profit "Musts" for your future jobs!

The new "41" Series comes in three models——the Lorain "41" two-speed Crawler; the rubber-tired, two-engined Moto-Crane 414 (6 wheels—4 driven); and the Moto-Crane 416 (6-wheel drive). These machines give you a complete range of travel speeds—from ¾ to 31 MPH—plus a great many profitable new features. All are available with gas, diesel or electric power.

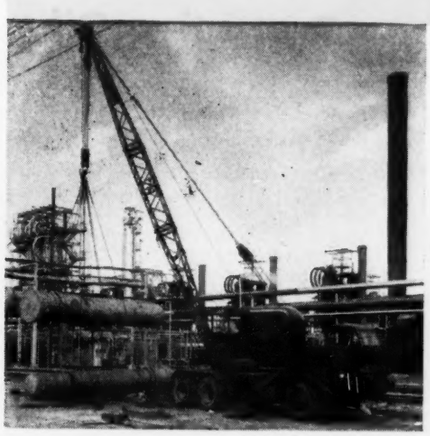
Don't wait! Ask us now for literature giving you all the facts on this latest machinery! Or call your Lorain distributor today.

Send for the new "41" Catalog NOW!



The new Moto-Crane 414 as a fast-traveling shovel. (Below, center.)

The new Moto-Crane 416 — the tough 6-wheel drive machine that took military going in stride. (Below.)



The new Lorain "41" Crawler is bigger, heavier, longer, has 30" wide swamp treads standard.

Reg. Trade Mark

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FIRE	PILE DRIVERS	SUCTION
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ARC-WELDING ELECTRODE for flat and horizontal fillet welding as well as for flat butt welding is characterized by exceptionally high melting rate which results in increased production and higher speeds at same welding current as other electrodes. Known as Type W-27, it requires less heat

input to joint at comparable production speeds, thus reducing warpage and internal cooling stresses. Operates on ac. or dc. with either straight or reverse polarity. It has low spatter loss and easy slag removal and produces welds of good surface appearance. Available in three sizes: 3/16x18 in., ¼x18 in., and 5/16x18 in.—**General Electric Co., Schenectady, N. Y.**

Fight Rust With Oakite Protective Oil

Want positive protection against rusting of iron or steel parts after grinding, machining or similar operations? Then merely dip units in Oakite Special Protective Oil. NO PRE-DRYING IS NECESSARY. This new Oakite rust-preventive displaces water and spreads a thin, impenetrable film over vulnerable surfaces to lock rust out!

FREE just-issued booklet gives complete details . . . tells how Oakite Special Protective Oil can be used also to remove finger prints from parts after inspection. Send for your copy TODAY!

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Go after these jobs with a WOOD ROADMIXER

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FARM-TO-MARKET ROADS
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CAA AIRFIELDS
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SAVE AS MUCH AS TWO-THIRDS IN STABILIZED BASE AND PAVING COSTS

Every one of those jobs listed on the left are "naturals" for either road mix surfacing, mix-in-place asphalt base, soil-cement base, flexible base or some type of stabilized base. And a Wood Roadmixer is the *one* piece of equipment that can give you the highest production at the lowest cost per square yard or ton.

Here's why:

A Wood Roadmixer is a complete traveling mixing plant. It uses low-cost native or local materials and in *one pass* produces as much as 250 tons per hour of ready-to-spread mix. It handles emulsion, road oil or soil-cement mixes.

When you buy a Wood Roadmixer, you buy *one* piece of equipment. It is pulled and powered by a standard crawler tractor. A supply truck parallels or is towed behind the Roadmixer. Both tractor and supply truck are standard equipment with every contractor and can be used for other work when Roadmixer is not in use. Two men can handle the average Roadmixer unit.

Those are brief facts why Wood Roadmixers are paying off for contractors everywhere—why a Wood Roadmixer will give you higher production at less cost and more profit than any similar equipment on the market.

For complete specifications and costs see your nearest Wood Roadmixer distributor or write direct.

ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

816 WEST FIFTH ST. LOS ANGELES 13, CALIF.

...Save installation time with limber, kink-resistant *PREFORMED* YELLOW STRAND

You've finished checking block, sheaves and drum. Now you're about to put on a new *Preformed* Yellow Strand line. Watch how its flexibility simplifies each stage of installation.

Note the willing way it comes off the reel or coil. Here's where unpreformed rope too often meets with injury. But there's no twisting, no kinking, with *Preformed* Yellow Strand—and that goes also for Lang lay and Independent Wire Rope Center constructions. Pent-up stresses have been *relaxed* by preshaping wires and strands during manufacture.

Since the ends do not flare out, limber *Preformed* Yellow Strand can be threaded quickly through blocks and sheaves... attached easily to the drum ...socketed or fastened without distorting the parts. Smooth, even first-time spooling further shortens changeover delay.

Crowning all these time-saving advantages is the *longer life* of *preformed* rope which postpones replacements, keeps men and machines on productive jobs.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Industrial Wire Ropes" contains useful facts, tables, pictures. Write for your copy.

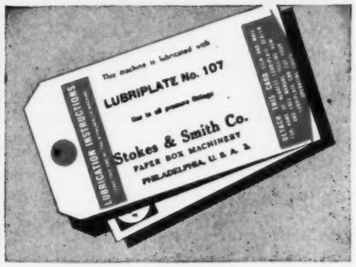
ARMY E NAVY

BROADERICK & BASCOM

Yellow Strand

***PREFORMED* WIRE ROPE**

LUBRICATION SERVICE FOR MACHINERY MANUFACTURERS



The machinery manufacturer can use LUBRIPLATE for initial lubrication . . . but once a machine is shipped, the lubrication is up to the user. To assure continued lubrication with LUBRIPLATE, we offer the TAG PLAN to machinery manufacturers.

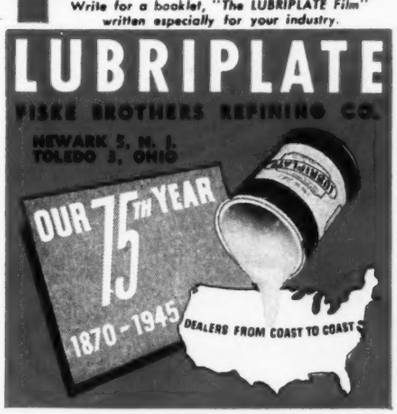
1. Points to be lubricated and types of LUBRIPLATE to be used are imprinted on the tag.
2. The name of the machine manufacturer on the tag gives authority to the recommendation.
3. A return postcard is part of each tag. The machine buyer signs the tag and mails it to us.
4. We notify the nearest LUBRIPLATE Dealer. We send the name of the dealer to the machine user.

LUBRIPLATE
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE
Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

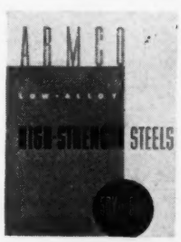
Write for a booklet, "The LUBRIPLATE Film" written especially for your industry.



NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.



LOW-ALLOY HIGH-STRENGTH STEELS—**The American Rolling Mill Co.,** Middletown, Ohio. (24 pp. illustrated) Design and fabricating advantages of these steels are presented in this booklet entitled "Armco Low-Alloy High-Strength Steels," which describes two of these Armco products with minimum yield strengths of 50,000 and 55,000 psi. Tells how these steels enable a lighter steel "shell" to carry more of the load in transportation equipment such as railway cars, trucks, buses and aircraft parts. This lighter weight without sacrifice of strength assures safe high speeds and bigger pay loads at less cost. Sections on drawing, forming and welding in addition to data on various designs.

★ ★ ★

STEEL CARS—**Youngstown Steel Car Corp.,** Niles, Ohio. (32 pp., illustrated) Describes facilities and products, including automotive bus, truck and trailer chassis parts; die-pressed channels; weldments; tunnel liners; railway cars; and repairs and repair parts. Subjects covered are hot and cold stamping, hand and automatic welding, inspection, heat treating and finishing, machining, engineering, and designing.

★ ★ ★

TUNNEL LINING—**Chain Belt Co.,** Milwaukee 4, Wis. (100 pp., illustrated) Provides source of reference for men engaged in tunnel lining activities. It is divided into two sections: (1) General information and (2) Typical jobs. Jobs covered include aqueducts; penstocks, dam diversion and spillway tunnels; sewer tunnels; highway tunnels; Chicago subway; railway tunnels; and mines. Features use of Rex pumpcrete. Priced at $3.

★ ★ ★

TURBINE PUMPS AND PROPELLER PUMPS—**Fairbanks, Morse & Co.,** Chicago 5, Ill. (Two 6-p. bulletins, illustrated) One deals with oil-lubricated turbine pumps and the other is about low-lift large capacity line known as Niagara propeller pumps. Outstanding features and advantages are described and general data, sizes and ratings are included.

LUBRICATION SERVICE FOR MACHINERY USERS

The manufacturer of machinery using LUBRIPLATE for initial lubrication wants the machine operator to continue to use it for service lubrication. LUBRIPLATE is the best lubricant for the job. That is why it was used in the first place. To assure you of a convenient source of supply of LUBRIPLATE, the machine manufacturer put a tag with a postcard on the machine before he shipped it. Tear off the postcard, fill in your name and address and mail it to us. We will notify you of the name and address of the nearest LUBRIPLATE Dealer and see that he calls on you.

℞ FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

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No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

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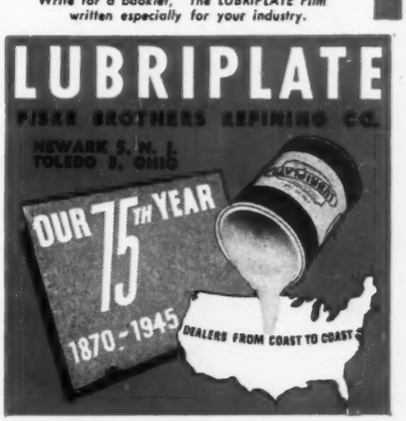

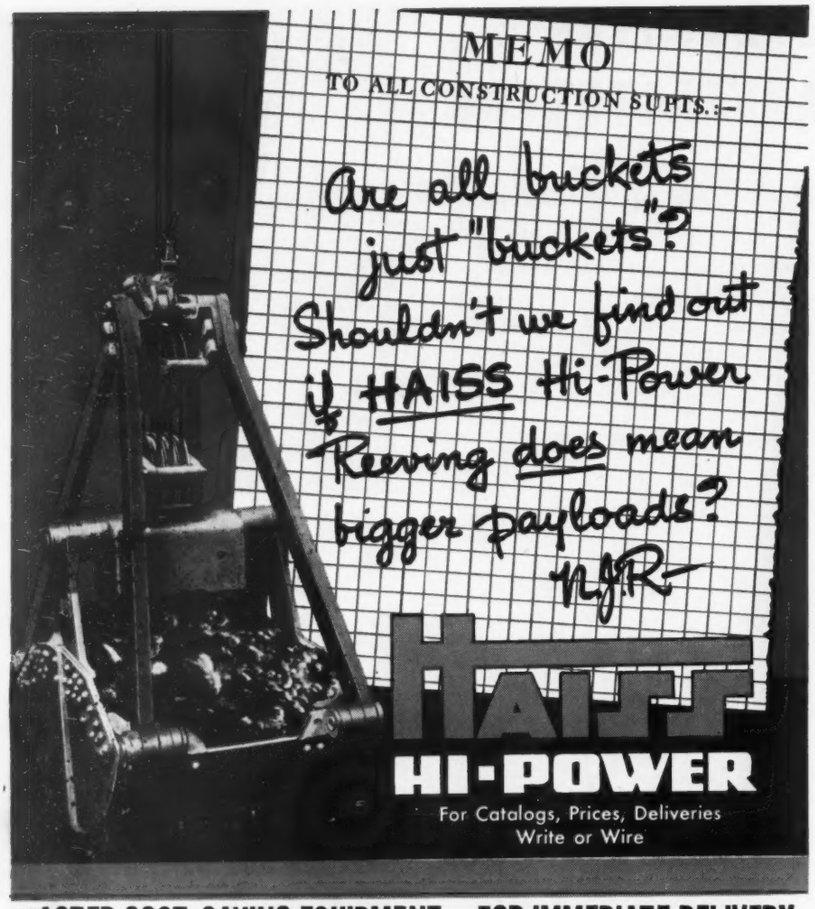
MEMO
TO ALL CONSTRUCTION SUPTS.:-
Are all buckets just "buckets"? Shouldn't we find out if HAISS Hi-Power Rewing does mean bigger payloads?
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HAISS
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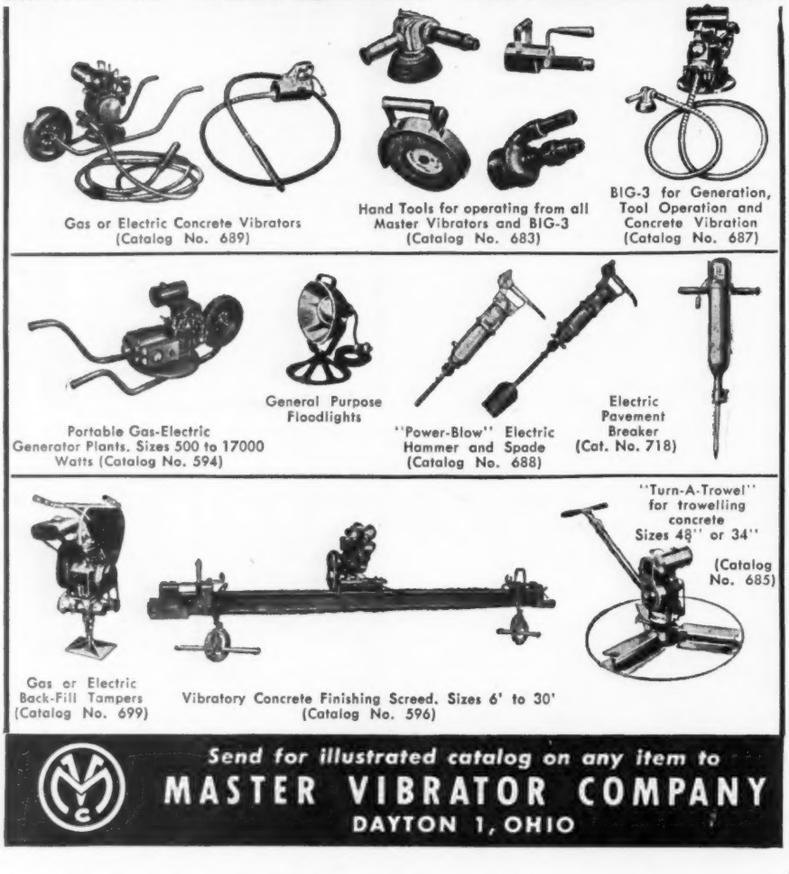
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Hand Tools for operating from all Master Vibrators and BIG-3 (Catalog No. 683)
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PROTECTIVE COATINGS—**Reilly Tar & Chemical Corp.,** Merchants Bank Bldg., Indianapolis 4, Ind. (20 pp., illustrated) Shows typical applications of coatings for metal, brick, cement, and wood surfaces. Describes Creocote paint for creosoted wood block floors, poles, guard rails and posts. Lists company's other products.

★ ★ ★

INDEX TO CUTTING INFORMATION—**Clipper Mfg. Co.,** St. Louis 10, Mo. (32 pp., illustrated) Describes masonry saws, their development, reason for design, important features of electric and gasoline models, knock-down style frames, and multiple cutting principle. Lists reasons for and advantages of new cutting method. Explains forced cutting and tells why arc of contact is important. Gives practical information on accessories and blades. Includes helpful hints on operation.

★ ★ ★

CONDUIT FOR UNDERGROUND PIPELINES—**H. W. Porter & Co.,** 825 Frelinghuysen Ave., Newark 5, N. J. (4 pp., illustrated) Covers four main advantages of Therm-O-Tile: (1) It keeps underground pipe insulation dry; (2) It holds grade of piping permanently; (3) It has greater strength than is required by A.S.T.M.; and (4) It is competitive in initial cost. Shows modified design for use in exceptionally wet or submerged locations.

★ ★ ★

Machine Shop Rebuilt

(Continued from page 87)

structure 80 or 90 years old, 300 ft. long by 80 ft. wide, with two rows of interior columns at the sides of the central craneway bay. The old roof consisted of wood purlins on timber trusses, covered with slate roofing and topped by a monitor of wood and glass. This construction had to be replaced with roofing of corrugated asbestos sheets and corrugated glass skylights supported on the existing timber trusses. A natural-draft ridge ventilator replaced the old monitor.

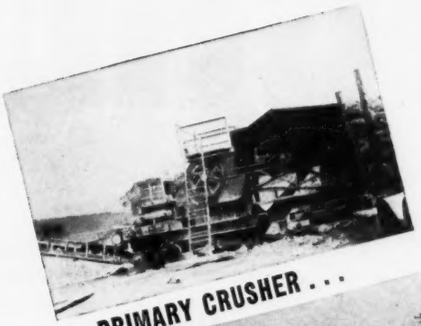
To protect the working floor below, the contractor laid a temporary ceiling composed of wood planks resting on the lower chords of the timber roof trusses and rainproofed this decking with two plies of roofing paper. All truss members passing through the temporary roof were flashed to make them watertight. Temporary gutters were cut through the

(Continued on page 136)

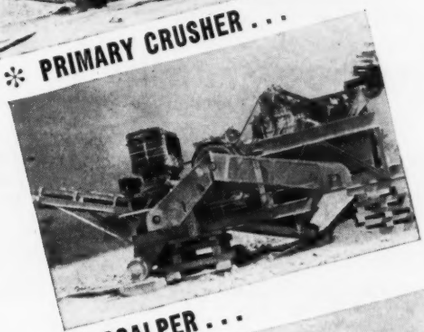
...a peek into the future—

Cedarapids Unitized Plant Economy
... for tomorrow's jobs

These 4 Units Make a
**** Dozen Complete Plant Combinations***
for ANY Job Needs!



* PRIMARY CRUSHER . . .



* SCALPER . . .

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Each element of the Cedarapids Unitized Plant is a complete unit in itself, balanced for high capacity used alone or with other matched sizes to handle every range of production volume.

What a Unitized Plant Will Mean to You

The basic economy of standardized machines capable of instant adaptation to special job conditions needs no explanation to operating contractors. Savings begin in lower purchase costs, and extend straight down the line through maintenance, repairs, and labor-saving flexibility to the ultimate goal of profitable contracts. Working machines are the only money-making machines, and the Cedarapids Unitized Plant is designed to give you the equipment flexibility necessary to keep the good contracts coming in, the plant on the job. Be sure you find out all about Cedarapids Unitized Plants BEFORE you buy your plant requirements for the FUTURE—and what a future it is if you have the right portable plant equipment! See your Iowa Distributor for complete details.

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PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
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TRAVELING (ROAD MIX) PLANTS
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COMPLETE LUBRICATION SERVICE

saves more time, more ways, in more departments than you imagined possible!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
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PRESSURE!

To prevent any one of your machines from breaking down and paralyzing the work of dependent machines, war-worn parts *must* have maximum protection. That's why we offer a complete line of quality products which provides exactly the right oil or grease for every application, no matter how unusual!

Regular on-the-job deliveries minimize interruptions for servicing, reduce inventory problems. You save office time, too, now that you can get even the most specialized lubricants from a *single* source. No need for last-minute rush orders, follow-ups.

Your Socony-Vacuum Representative is trained to analyze and solve maintenance and equipment problems . . . to adapt our time-saving maintenance schedules to your special requirements . . . to teach recruits scientifically correct lubrication. He also arranges for engineering aid, when needed.

Socony-Vacuum Contractor's Service goes far beyond mere distribution of fuels and lubricants. It's COMPLETE SERVICE—designed to save time all through your operation!

"ON YOUR STAFF—BUT NOT ON YOUR PAYROLL"—

Your Socony-Vacuum Representative

CORRECT LUBRICATION FOR EVERY PART OF EVERY MACHINE YOU OPERATE . . .
PLUS
1 ENGINEERING HELP on time-losing operating problems; 2 TESTED MAINTENANCE SCHEDULES that minimize service man-hours—keep equipment on the job;
3 PROMPT, DEPENDABLE DELIVERY—a reliable, on-the-job service that eliminates inventory problems for you!

TUNE IN "INFORMATION PLEASE"—MONDAY EVENINGS, 9:30 E.S.T.—NBC

A Byword in Wire Rope:

— FOR 6 BIG REASONS!

YOU LEARN A GREAT DEAL from individual service records about the efficient performance, the low average cost of Roebling "Blue Center" Steel Wire Rope. But records tell you only part of the story . . . of its toughness, its reserve strength, its basic dependability under *all* conditions of operation.

What makes "Blue Center" a rope you can choose with full confidence? The Roebling ***reputation,*** for one, and the superior Roebling-made ***steel*** in the wires.

There's the ***skill*** born of a century's experience that goes into the rope's fabrication, the modern, unsurpassed ***facilities*** used.

Add to the never-ending ***research*** that gives you longer rope life, the practical ***engineering*** that assures the best rope for your purpose.

Remember those facts when you order from America's first wire rope maker. They back up the performance you can expect from every reel of Roebling Wire Rope, preformed or non-preformed . . . and every correctly designed Roebling "Blueclad" fitting.

Now that increasing quantities of Roebling Wire Rope are available, we suggest you place your orders early. Call or write our nearest office . . . a Roebling engineer will help you select the correct rope and get full productive life from it.

JOHN A. ROEBLING'S SONS COMPANY
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Wire Rope and Strand • Fittings • Slings • Cold Rolled Strip • Round and Shaped Wire • Wire Cloth and Netting • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

ROE

PACEMAKER IN

"BUY ROEBLING"

ROPE REMINDERS

Proper maintenance of wire rope pays off. And it's also a good slogan to remember in keeping comparative records of wire rope service.

It's desirable to keep accurate, complete records to check on operation. But even the most carefully kept records may be misleading, unless correctly analyzed.

For example, time on the job is not necessarily a yardstick of service. Ropes working less than average may have to contend with corrosion. Besides, a rope that operates only a few days a month may get less attention and care than a steadily working one.

The one invariable rule in record-keeping is that each installation must be considered individually. That's where Roebling engineers can be of invaluable service to you. They know wire rope, and they've had experience with a wide variety of rope-operated installations. It will pay you to consult them.

BLING

JR ROEBLING

WIRE PRODUCTS

Always fast-priming

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Even after hundreds of hours of toughest service, water is kept in and air out as effectively as when new because the seal rings are made of Tungsten Carbide, a material so hard it cuts glass like a diamond. There's no loss of vacuum, so high priming efficiency is constantly maintained. The performance of every Carver pump is carefully checked in our testing laboratories to make sure that it meets our high standards for performance on the job. The "Certified" tag is your assurance of peak performance on your toughest jobs. Carver pumps are available in a wide range of sizes from 1½" to 10". For details see your Carver dealer.

THE CARVER PUMP CO.

Muscatine, Iowa

CARVER CENTRIFUGAL
Certified **PUMPS**

(Continued from page 130)

walls to carry off rainwater from the side bays, and the center bay was drained by temporary leaders running out through the windows at a lower level.

Craneway Structure

Craneway trusses and columns in the shop presented a more difficult problem. Existing timber columns supporting wooden mezzanine floors in the side bays were not replaced. Instead, the columns were shored up until concrete foundations could be built to support them and the adjacent craneway columns.

Trusses, columns, and column footings of the craneway were removed, and the columns were replaced with steel furnished and erected by Bethlehem Steel erectors. This replacement was made in six 50-ft. sections through the 300-ft. length of the machine shop. Upon completion of each section of craneway framing, the workmen went back to the roof. Crane service was maintained on both sides of a section under alteration, and shop operations were so scheduled that no loss of machine production was incurred. Before crane service was interrupted in any section of the building, large work was put in position on the machines to keep them busy during the interval of reconstruction. Average time for completion of a section of craneway was 19 working days.

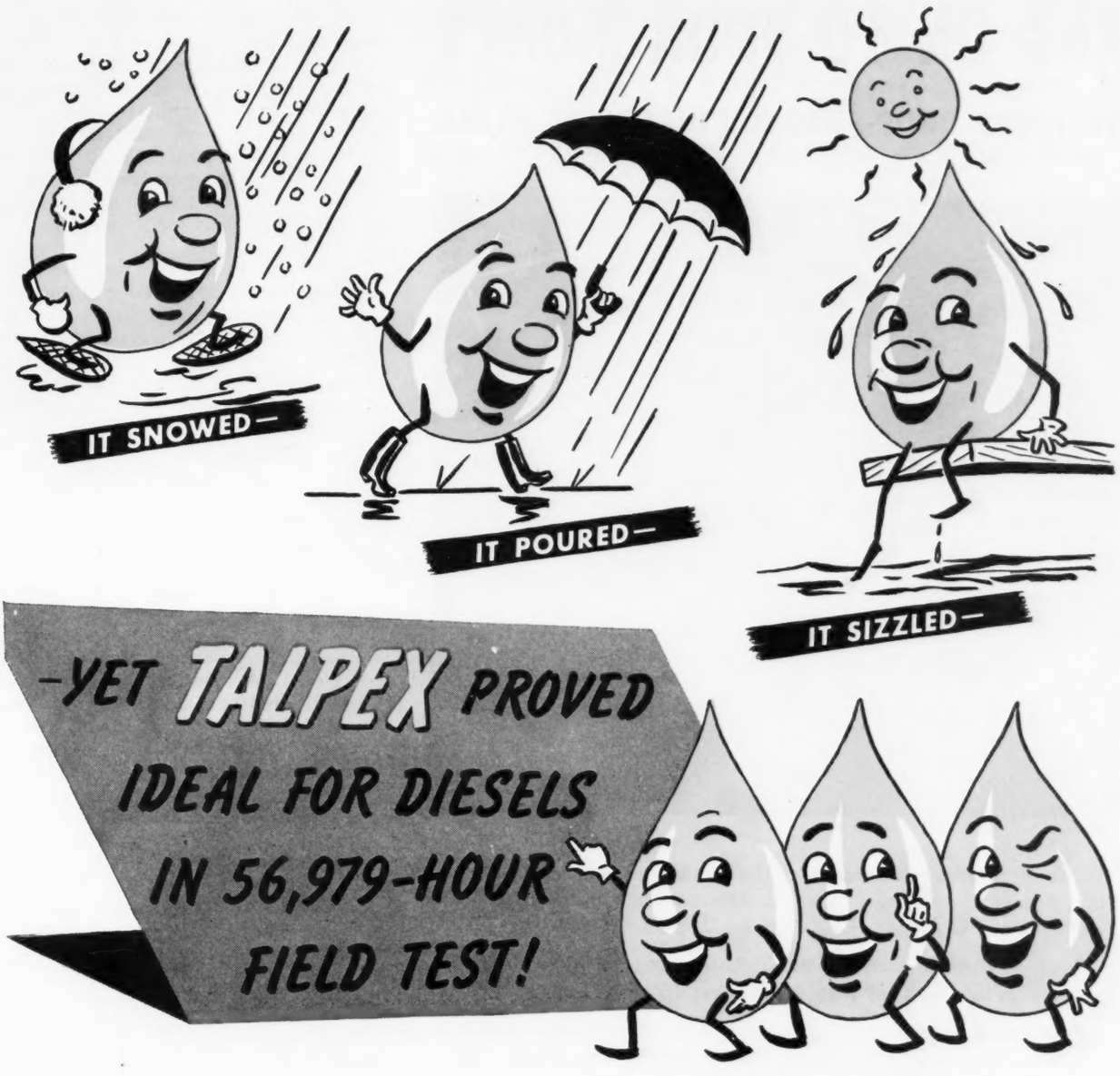
Rebuilding Floor

Upon completion of the last section of steel frame and roof, work upon the floor was begun. The old wood floor consisted of heavy 12x18-in. timbers with 4x12-in. wood planks on top. Progressing section by section, in the same way as on the superstructure of the building, the contractor's crew removed the timber floor and filled the space under the floor, about 3 ft. deep, with sand. On the sand fill of each section, the workmen placed a 10-in. reinforced-concrete floor slab before moving ahead to the next section. By the time the concrete slab of the latter section had been placed, the slab in the preceding section had hardened sufficiently to permit laying the wood block floor.

Scheduling of Operations

An accompanying layout and progress schedule show the division of the machine shop into sections and the timing of operations as set up by the contractor in cooperation with the owner's engineers and yard management. Dates of the reconstruction operations were entered on this schedule, and the number of days'

(Continued on page 138)



CAREFULLY supervised field tests of Shell Talpex E in 37 Caterpillar engines during 56,979 hours of operation proved it the ideal Diesel engine oil—regardless of weather.

In the field tests a sample of each drain was kept for analysis. In each, Talpex E showed inherent oxidation stability and resistance to deterioration.

Four of the engines were dismantled for examination after some 1000 hours of operation. All four were exceptionally clean throughout and showed complete freedom from ring-sticking and bearing corrosion.

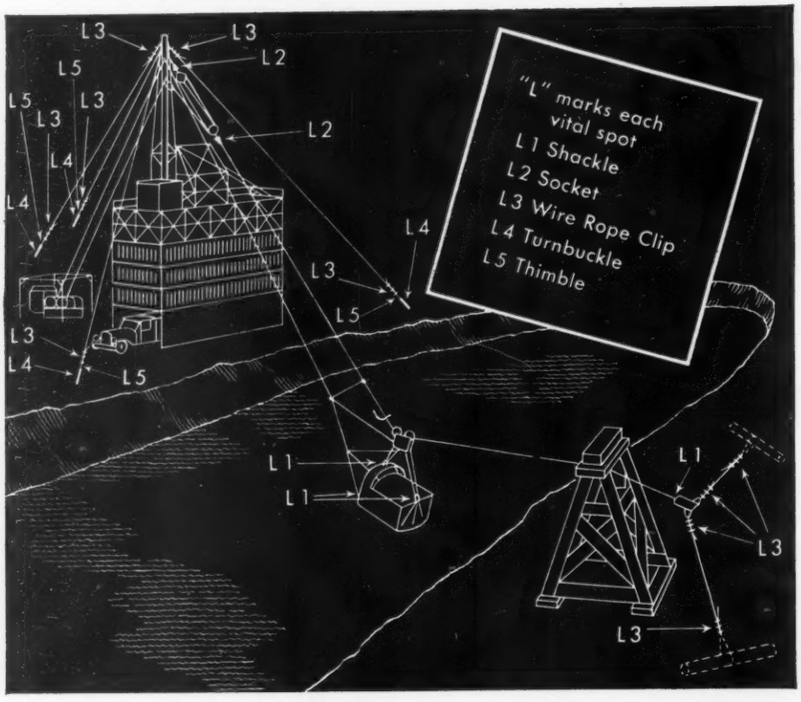
In the final analysis, Talpex E proved to be the ideal lubricant for high-speed Diesel engines. Beside lubricating, hard-working Talpex E provides *extra* qualities: (1) High detergency; (2) Exceptional oxidation stability; (3) Low carbon-forming tendency; (4) Is non-corrosive to alloy bearings.

For further information on Shell Diesel lubricants get in touch with Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York; or 100 Bush Street, San Francisco 6, California.

SHELL DIESEL LUBRICANTS SHELL

HANG ON TO YOUR MONEY

WITH THESE DROP-FORGED FINGERS OF STEEL



Wherever you use wire rope or chain — for hoisting and material handling in your plant, aboard ship, or on drag-lines for stripping and excavating — you can save money three ways by specifying Laughlin drop-forged fittings.

1. Save money on purchase price . . . because you can get *standard* fittings for almost any purpose from Laughlin's complete line.
2. Save money on materials . . . because drop-forged fittings — acknowledged superior for strength and long life — give your equipment full protection.
3. Save money by avoiding accidents . . . because Laughlin's fittings have more safety features than any other line . . . examples: unique "Fist-Grip" Safety Clip and Safety Hooks.

For over 78 years, Laughlin fittings have been highly regarded for their rugged, uniform quality. For a catalog of these fittings, write today to Dept. 1, The Thomas Laughlin Company, Portland 6, Maine. Laughlin fittings are distributed through mill, mine and oil field supply houses.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

(Continued from page 136)

work which it was expected would be lost by each of the major machines was set down, as shown in the illustration. Actually, because of the method of putting large pieces of work on the machines before reconstruction of a section started, the production time lost by any machine was practically nil, providing scheduled performances were accomplished.

While the contractor was rebuilding the craneway, roof and floor of the building, Bethlehem Steel Co. forces were carrying out an exacting reconstruction program of their own by changing over the entire shop from shaft-and-pulley drive to individual electric-motor belt drives for all machines.

Progress

Reconstruction of the craneway, roof and ventilator of the 300x80-ft. machine shop was completed by the contractor in five months, from July 10 to December 13, 1944. For reasons of economy, the rebuilding of the floor was postponed until all the overhead work had been completed. A crew remained on the job an additional two months to remove the old timber floor and replace it with new concrete and wood-block construction. The contractor's forces worked 8 hr. a day 6 days a week.

Supervision—Design and construction involved in modernization of the machine shop were under the direction of J. S. Myers, plant engineer, New York yards, Bethlehem Steel Co. Jack Alexander, vice president, was in charge of construction operations for the Bertoldi-Kelter Co., Inc., contractor, New York.

★ ★ ★

Pressure Welding

(Continued from page 93)

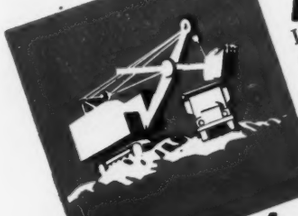
other factors. In the rolling method, specifications called for three beads to be run. In position welding four beads were called for, and if the weld did not meet test specifications additional beads were added. A minimum of four beads

(Continued on page 142)

DEPENDABILITY PROVED in a greater variety of applications than *any other diesel*

Proved

In heavy-duty trucks, both on-the-highway and off-the-highway.



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In all types of heavy-duty earth moving, road building and material handling equipment for contractors and aggregates producers.

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In every kind of mining power application . . . both above ground and below . . . stripping, loading, hauling, stationary and marine.

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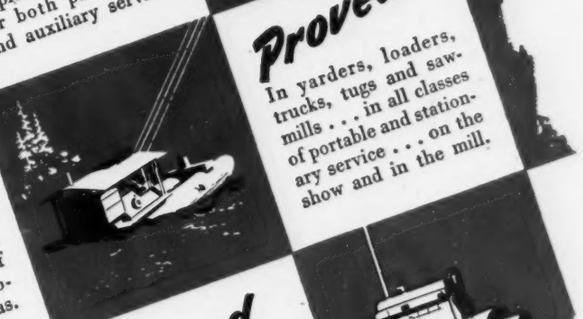
In tugs, ferry boats, commercial fishing boats, fire boats, as well as pleasure craft . . . for both propulsion and auxiliary service.

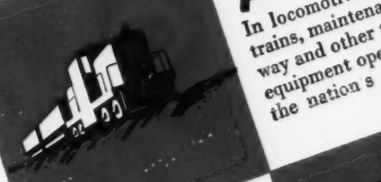


Proved

In yarders, loaders, trucks, tugs and sawmills . . . in all classes of portable and stationary service . . . on the show and in the mill.

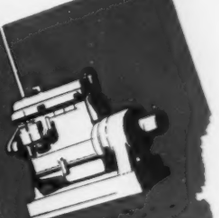
Proved

In rotary rig, cable tool, pumping, generating and well service applications in all of the important petroleum producing areas.



Proved

In locomotives, motor trains, maintenance-of-way and other types of equipment operated by the nation s railroads.



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In the widest range of stationary applications, such as flour and feed mills, ice and refrigeration plants, dairies, cotton gins and many more.

Read the Record

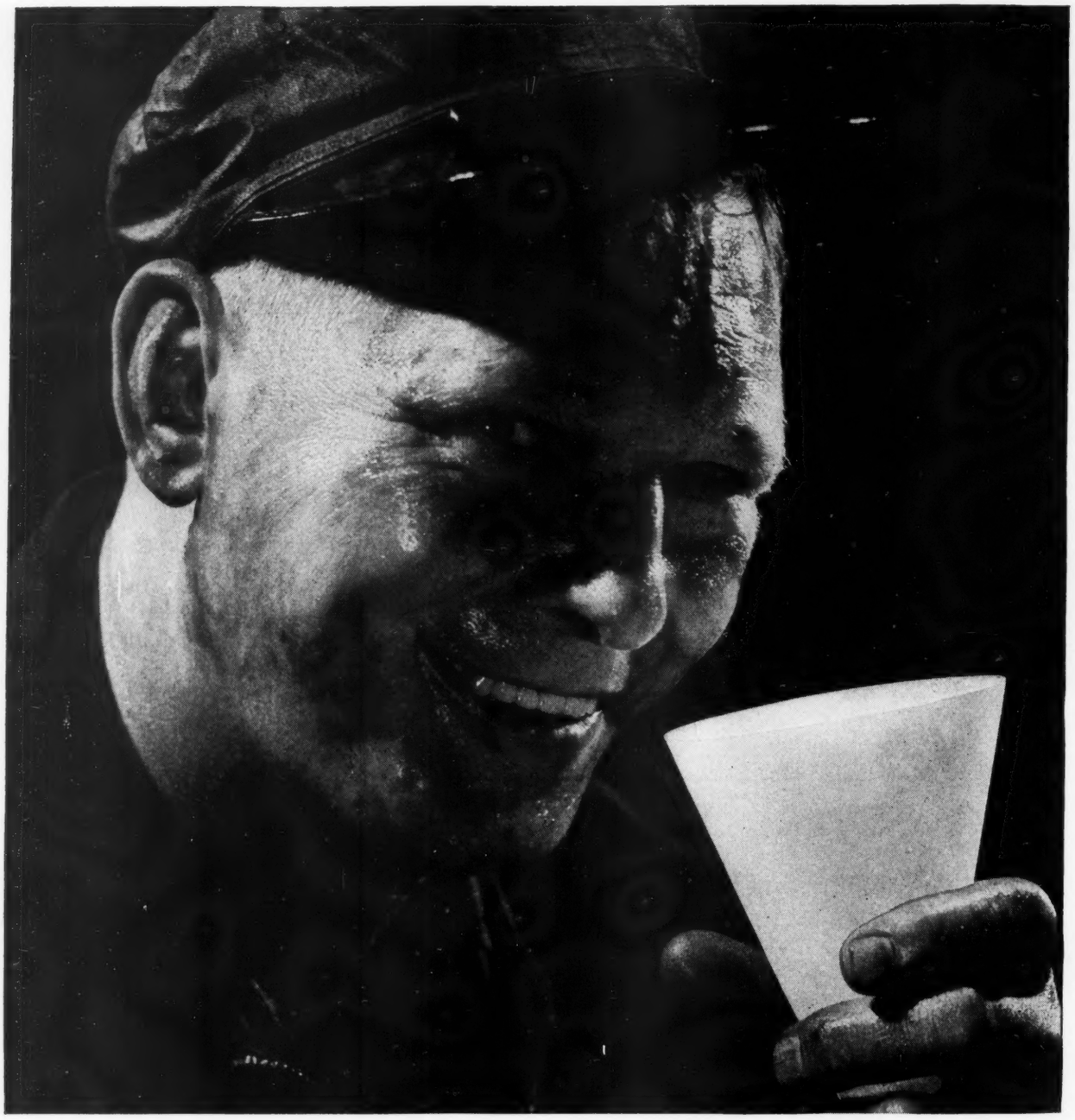
1. More than 90% of the long-line, franchise-operated, heavy-duty, diesel-driven trucks in the 11 Western States are Cummins Diesel-powered.

2. In the world's largest petroleum producing region—the Mid-Continent Area—Cummins Diesels power more rigs than any other diesel engine.

3. More yarders, loaders and trucks in the Northwest Woods are powered by Cummins Diesels than by any other single make of diesel engine.

4. On the Mesabi Iron Range—largest in the world—most of the rubber-tired earth and ore moving equipment is Cummins Diesel-powered.

CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana



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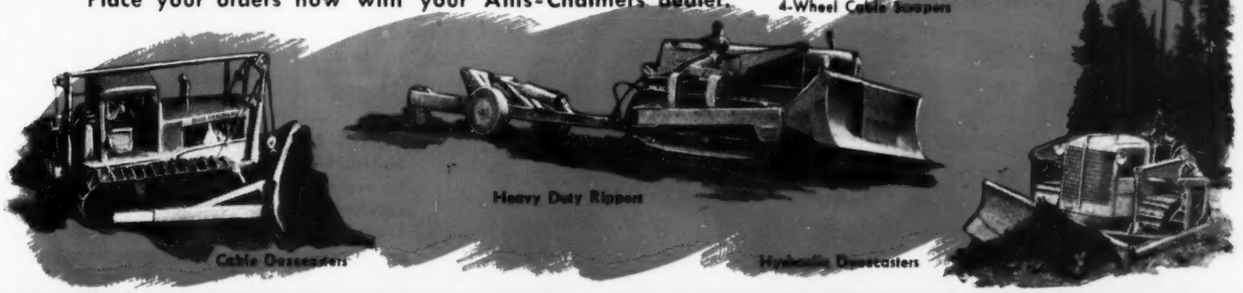
Here's efficiency! One man, one tractor, a Gar Wood Hydraulic Bulldozer in front and a 2-Wheel Scraper behind, handle practically any earth moving job, quickly and economically.

GAR WOOD ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER

4-Wheel Hydraulic Scrapers

4-Wheel Cable Scrapers

For Top Efficiency Use Gar Wood Road Machinery. That's a rule with many leading contractors and County Road Authorities. A large number of them began with a Gar Wood combination such as that shown above—found it superior on the job—ordered more units. As a result, the present volume of orders is the greatest in Gar Wood's history. Place your orders now with your Allis-Chalmers dealer.



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Stick this in your hat for future reference: For each and every purpose to which Vibrators are applicable in the concrete industry, we can supply the equipment that will give you not only the best and fastest placement, but also the maximum of dependability and trouble-free service. Our long famous JACKSON line includes many vibrators of both the internal and external type; the finest equipment available for:

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If you have a Vibrator problem, by all means let us show you how to solve it to best advantage. Drop us a line. No obligation, of course.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

(Continued from page 138)

was used on river crossings, and the joint was further strengthened by addition of a split welding sleeve.

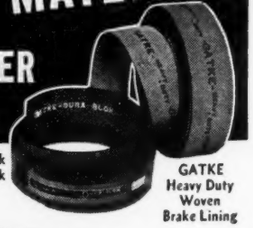
Cold Wrinkle Bending of Large-Diameter Pipe

Ordinary pipe-bending methods, if applied to the thin-walled large-diameter tubes used on this job, would result in the crushing of one side, forming a serious restriction in flow as well as introducing areas where load failures might occur. A new pipe-bending technique, developed for these large-diameter pipes, maintains the effective pipe diameter, displaces all metal outwardly and does not offer obstacles to applying the necessary anti-corrosion protection materials.

The pipe is clamped in a device which resists deformation and maintains the full circle of the metal, and power is applied on a short lever arm to force a wrinkle bend. The wrinkle is displaced outward between the last clamping jaw and a stop section which prevents change in the outside of the circular area in which the wrinkle is located. By forming

(Continued on page 148)

BETTER BRAKE MATERIALS for BETTER RESULTS



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GATKE Heavy Duty Woven Brake Lining

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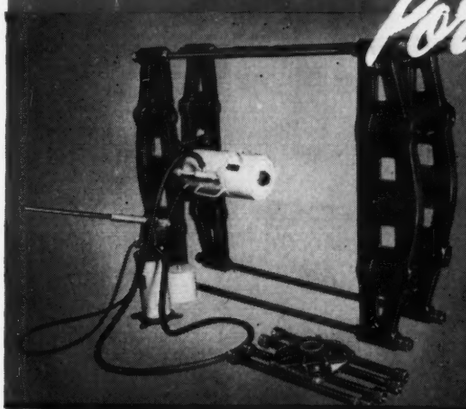
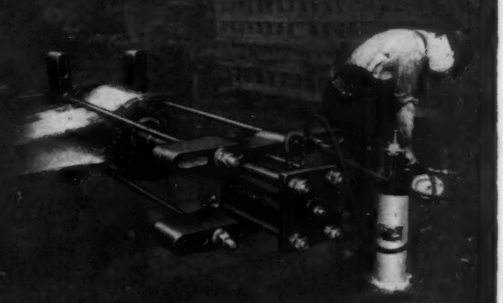
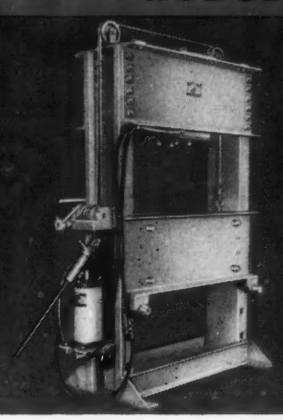
RODGERS *Portable* UNIVERSAL PRESS



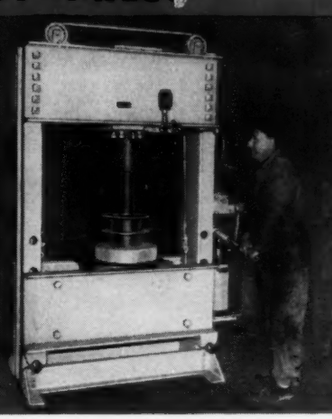
Left: Here is a Rodgers 200 ton Universal with back plate and rods shown beside it. At right is a Rodgers Universal mounted around a large pitman to pull the shaft. Real power—easy to use!



RODGERS *Flexible* SHOP PRESS



Left: A Rodgers 100 ton Shop Press—study its simplicity — note pins below bed for increasing opening —hand pump mounted on side. Right: A bushing is easily pressed into a sheave with a few strokes of the hand pump.



STOP and think of all the uses you can find for these versatile Rodgers Presses — pulling gears, pinions and wheels; pressing shafts, bushings and pins, squeezing, clamping and jacking operations —wherever you need 50 to 200 tons of easily-applied hydraulic power.

The Rodgers Universal is a unique portable unit for field or shop service. It is used on a stand as an ordinary press, on its side or flat and is easily assembled around equipment for special operations. Rodgers Hydraulic Hand Pump or Power Pump supplies power.

A Rodgers Shop Press is a flexible unit with a bed that is easily raised or lowered to accommodate various size work. Cylinder may be adjusted across entire width of bed. Rodgers Hand Pump or Power Pump furnishes pressure.

If you have equipment to service you can save yourself hours of time and labor with a Rodgers—they often pay for themselves on a tough job or two. Write for *all* the details. It will be profitable.

Send for this new catalog . . .

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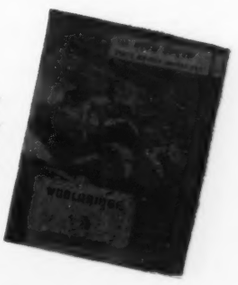
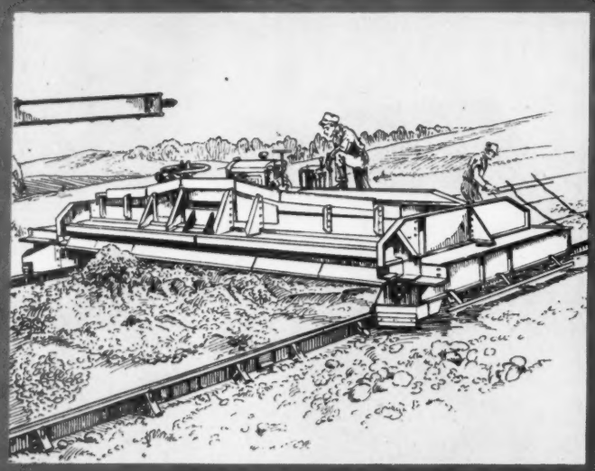
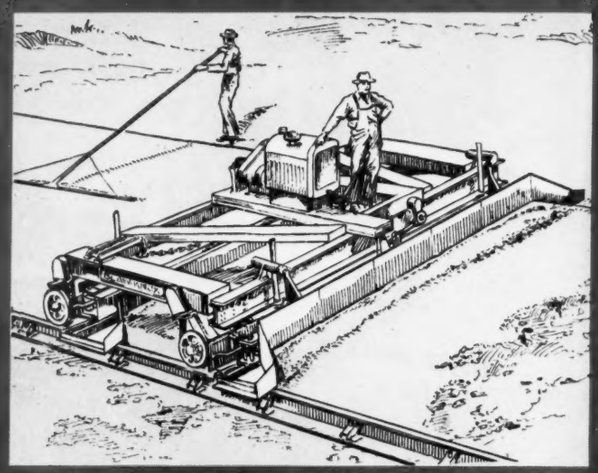


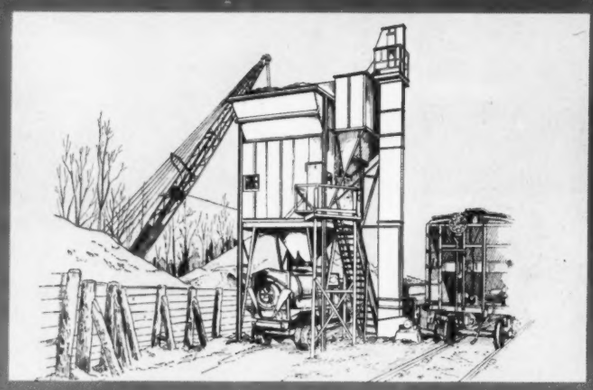
BLAW-KNOX HAS THE ANSWERS TO



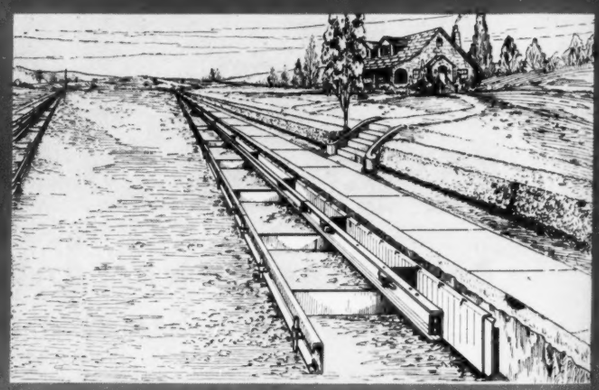
PAVING SPREADERS FOR ROADS AND AIRPORTS



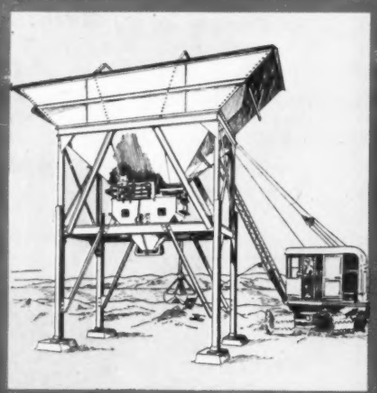
FINISHING MACHINES FOR ROADS AND AIRPORTS



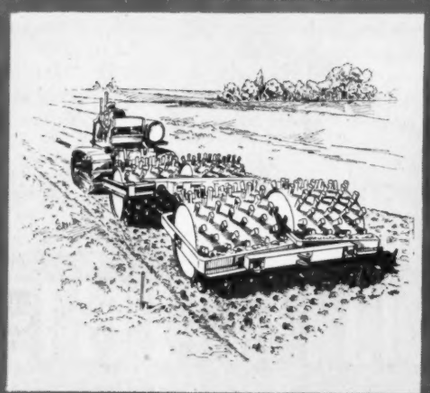
TRUCK MIXER LOADING PLANTS



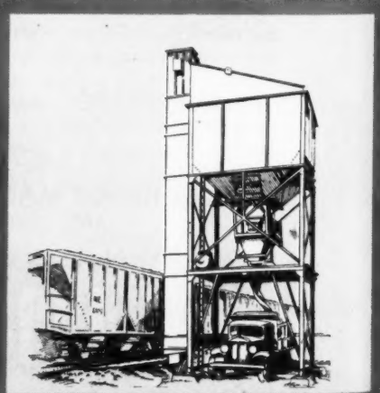
STEEL STREET FORMS



AGGREGATE BATCHING PLANTS

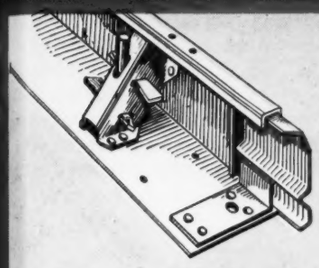


SHEEPSFOOT TAMPING ROLLERS

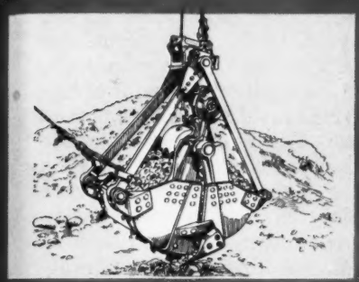


BULK CEMENT PLANTS

FASTER CONSTRUCTION



PAVING FORMS FOR ROADS AND AIRPORTS



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Washington — Matt A. Doetsch Mach. Co.
FLORIDA
Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company
Tampa — Florida Equipment Company
GEORGIA
Atlanta — W. C. Caye & Company
IDAHO
Boise — Intermountain Equip. Co.
ILLINOIS
Chicago — O. T. Christerson Co.
St. Louis, Mo. — O. B. Avery Company
INDIANA
Indianapolis — Reid-Holcomb Co.
Chicago, Ill. — O. T. Christerson Co.
Louisville, Ky. — Brandeis Mach. & Supply Co.
IOWA
Davenport — Gierke-Robinson Co.
Des Moines — Herman M. Brown Co.
KANSAS
Kansas City — G. W. Van-Keppel Co.
KENTUCKY
Louisville — Brandeis Mach. & Supply Co.
LOUISIANA
New Orleans — Southern States Equip. Co.
MAINE
Portland — Stanley-Cadigan Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply
Division of Lakeshore Engineering Co.
MINNESOTA
Duluth — Borchert-Ingersoll, Inc.
St. Paul — Borchert-Ingersoll, Inc.
MISSISSIPPI
Amory — Dalrymple Equip. Co.
New Orleans, La. — Southern States Equip. Co.
MISSOURI
Kansas City — G. W. Van Keppel Co.
St. Louis — O. B. Avery Company
MONTANA
Billings — Western Const. Equip. Co.
NEBRASKA
Omaha — Anderson Equipment Co.
NEVADA
Los Angeles, Cal. — E. M. Ornitz & Co.
San Francisco, Cal. — C. H. Grant Co.
NEW HAMPSHIRE
Barre, Vt. — Cassellini-Venable Corp.
Boston, Mass. — The Equipment Co.
Portland, Me. — Stanley-Cadigan Co.
NEW JERSEY
New York, N. Y. — R. E. Brooks Company
Philadelphia, Pa. — Giles & Ransome
NEW MEXICO
Albuquerque — Lively Equipment Co.
NEW YORK
Albany — Larkin Equipment Co.
Buffalo — Trevor Corporation
Elmira — LeValley, McLeod & Kinkaid
Endicott — Newing Motors Co., Inc.
New York — R. E. Brooks Company
Rochester — Keystone Builders Supply
Syracuse — Syracuse Lumber Co.
Utica — McQuade & Bannigan, Inc.
NORTH CAROLINA
Raleigh — Carolina Tractor & Equip. Co.
Salisbury — Carolina Tractor & Equip. Co.
OHIO
Cincinnati — Rish Equipment Co.
Cleveland — H. B. Fuller Equipment Co.
OKLAHOMA
Oklahoma City — Leland Equipment Co.
Tulsa — Leland Equipment Co.
OREGON
Portland — Contractors Equipment Corp.
PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company
RHODE ISLAND
Boston, Mass. — The Equipment Co.
SOUTH CAROLINA
Columbia — Jeff Hunt Road Machinery Co.
SOUTH DAKOTA
Rapid City — J. D. Evans Equip. Co.
TENNESSEE
Chattanooga — Nixon-Hasselle Co.
Knoxville — Wilson-Weesner-Wilkinson Co.
Nashville — Wilson-Weesner-Wilkinson Co.
Memphis — Road Bldrs. Equip. Co.
TEXAS
Dallas — Conley-Lott-Nichols Mach. Co.
Houston — R. B. Everett & Co.
San Antonio — Acme Wire and Iron Co.
UTAH
Salt Lake City — C. H. Jones Co.
VERMONT
Barre — Cassellini-Venable Corp.
VIRGINIA
Richmond — Rish Equipment Co.
Roanoke — Rish Equipment Co.
WASHINGTON
Seattle — Star Machinery Co.
Spokane — Intermountain Equip. Co.
WEST VIRGINIA
Charleston — Rish Equipment Co.
Clarksburg — Rish Equipment Co.
WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.
WYOMING
Billings, Mont. — Western Const. Equip. Co.
Denver, Colo. — Ray Corson Mach. Co.
ALASKA
Seattle, Wash. — Northern Commercial Co.
CANADA
Montreal — Watson Jack & Co., Ltd.
Toronto — W. L. Ballentine Co.
Vancouver, B. C. — B. C. Equip. Co., Ltd.
Winnipeg — Kane Tractor & Equip. Co.
Saskatoon — Richardson Road Mach. Co.
NEWFOUNDLAND
St. Johns — Dominion Distributors Co.

"Paid for itself on first three jobs" . . . says one user of

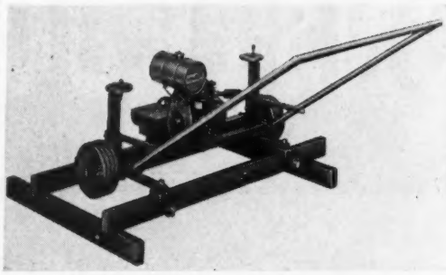
Whiteman

CONCRETE EQUIPMENT

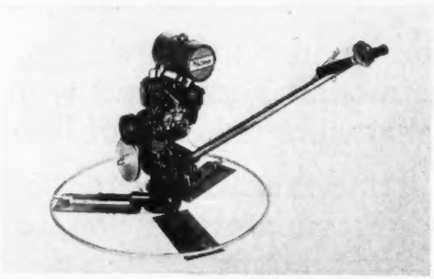
Small contractors can get big operators' machine economy on small jobs. Here's how:

- Saves time and money
- Keeps your finishers happy by eliminating slow, back-breaking knee work.
- Produces perfect smooth and level floors.

For Rodding, Floating and Finishing equipment—write or wire for nearest distributor.



MODEL "RS", LIGHTWEIGHT RODDING MACHINE For screeding slab widths 3 to 10 ft. Also available in Model 44 for 10 to 20 ft. width.



MODEL "J", LIGHTWEIGHT FLOATING-FINISHING MACHINE. Only 105 lbs—provides easy handling and portability with machine economy. 34" diameter (will go through 36" doorways).

Whiteman MANUFACTURING CO.

3249 Casitas Avenue Los Angeles 26, California

...SPEED CONSTRUCTION with CLIPPER PORTABLE HOISTS
• PORTABLE . . . .
• FLEXIBLE . . . . .
• AUTOMATICALLY UNLOADS . . . .
A One-Man Operation ... Economically handles brick, tile, cement blocks, mortar, and other construction items.
$49.50 Available to You On FREE TRIAL
CLIPPER MFG. CO.
4037 MANCHESTER • ST. LOUIS 10, MISSOURI
Factory Branches
Philadelphia Kansas City Austin, Texas
CLIPPER PORTABLE HOISTS by the Makers of CLIPPER MASONRY SAWS

(Continued from page 142)

successive wrinkles, not closer than 15 in., any desired degree of bend can be obtained while retaining within the pipe the necessary clearance for scrapers, swabs and go-devils for cleaning.

When forming cold wrinkle bends in electrically welded pipe, the seam or bead was not permitted to come within the area distorted by formation of the wrinkle. In pressure welding of sections an attempt was made to align longitudinal welds within 1 or 2 in. for uniformity in handling, but no attempt was made at aligning longitudinal seams for arc welding.

River Crossings

Virtually every known type of terrain was encountered in traversing seven states. Many difficult river crossings were made, 67 in all, 24 of which required special installations. Aerial crossings in which the pipeline was supported by cables were made across the Colorado of Texas, Brazos, Sabine, Red, Buffalo and Dix rivers. These were special type crossings with two pairs of suspension cables over high towers and two side, or sway, cables to stabilize the pipe laterally. Suspension spans of the six aerial crossings varied from 560 to 1,280 ft. between towers.

The Mississippi was crossed by placing the line on the Greenville, Miss., highway bridge. To keep the dead load on the bridge symmetrical and as low as practicable the pipeline was divided into two 18-in. branches, one carried on the outside of each truss on aluminum brackets and rollers. The line, welded joint by joint on a platform at one end of the bridge, was threaded through the roller supports by means of a winch line towed by a tractor at the opposite end of the bridge. A similar procedure was used in placing the line over the specially constructed aerial crossings.

Other Crossings

On other stream crossings the pipeline was submerged in the river beds, at times in trenches blasted in rock. For minor streams with no serious hazards a single line of pipe with the same outside diameter was used but the wall thickness was increased from the standard ¼ in. to ⅜ in. to provide extra strength. On navigable and hazardous rivers submerged multiple lines were used. Three 16-in. lines with a ⅜-in. wall thickness were substituted for the 24-in. line, and two such lines were substituted for the 20-in. stream crossings.

Nearly 300 highway and 62 railroad crossings were necessary. These were all made underground. Crossings of paved

(Continued on page 150)

Preformed wire rope

SAVES MONEY 3 WAYS

Are you looking for new ways to cut your production costs? Then follow the lead of successful operators, in every industry, who use Preformed wire rope. Their records prove that it saves money. First, because it lasts longer. This results from Preformed's ability to resist bending fatigue. Second, it saves money because it withstands heavy shock loads and thus helps avoid costly shut-downs. Third, Preformed spools better on the drum, and helps to maintain a profitable speed of operation. You can gain these and many other advantages by specifying Preformed the next time you order wire rope.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

Essential HEAD PROTECTION—

M·S·A Skullgards

Wherever men work on construction projects, the danger of head injuries is always present. Guard your men against these head hazards with M.S.A. Skullgard Protective Hats—famous for years for their tremendous resistance to fracture, yet Skullgards are comfortable, lightweight and well-balanced.

M.S.A. Skullgards, built of high-pressure molded laminated bakelite, are tough and durable; unaffected by rain, sun, perspiration, oils or greases. They provide a sturdy shield against falling and flying objects. Descriptive bulletin on request.

MINE SAFETY APPLIANCES CO.
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PA.
DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

(Continued from page 150)

highways and railroads were accomplished by drilling under the roadway and shoving the pipe through.

Compressor Stations

Raw gas from the Texas Gulf Coast gas and distillate fields is delivered 1,265 mi. away through the aid of seven compressor stations—each having about 8,000 hp. —which repressure the gas to 750 psi. at the 157-mi. jumps between stations. The seven-station initial design will transport 207,000,000 cu. ft. per day and an ultimate design, with 14 compressor stations operating at capacity, will deliver 262,000,000 cu. ft. per day, achieving a net operating gain of 20 percent for the cost of the compressor stations alone.

Compressor stations are complete units having repair shops, garages for storage of vehicles and facilities for cleaning, compressing and cooling the gas. Housing accommodations for employees who are on 24-hr. a day call are also provided.

25,000,000 Man-Hours of Work

Nine major pipeline contractors plus two steel erection firms handling the aerial river crossings employed from

(Continued on page 154)

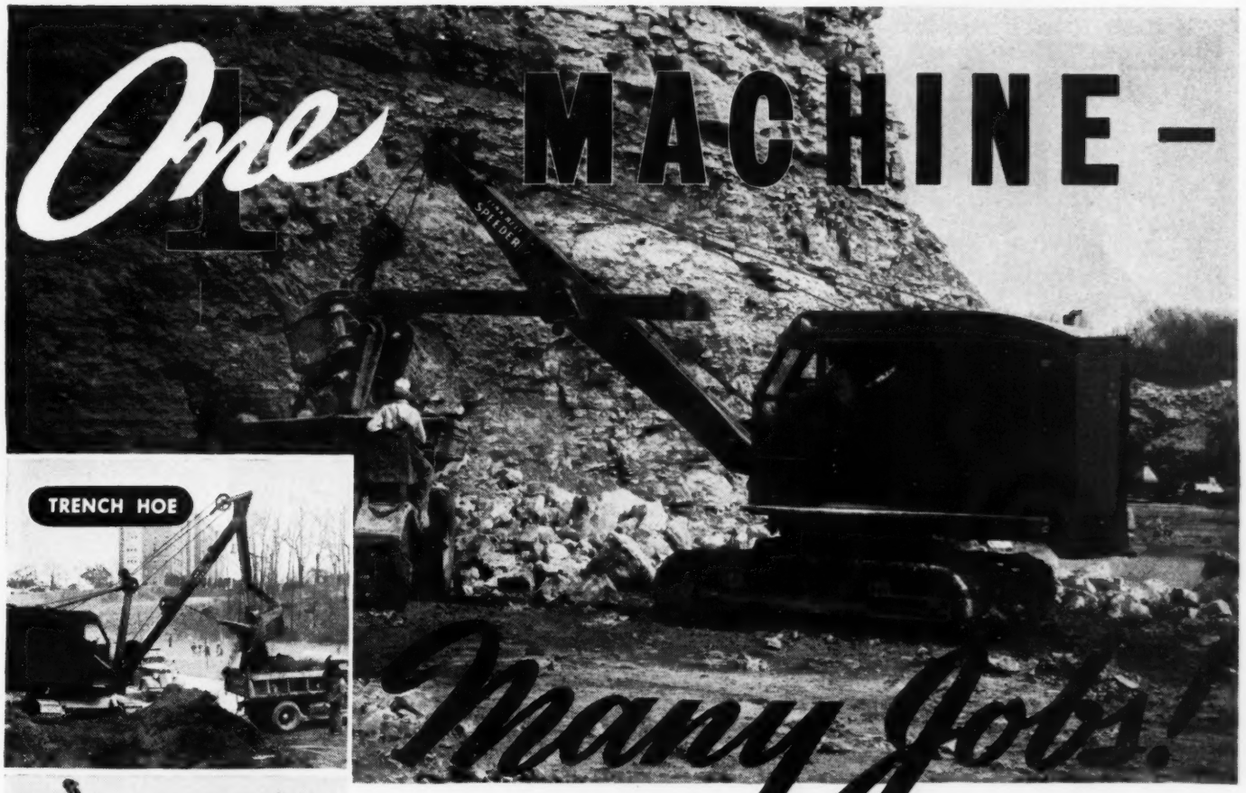
Watch

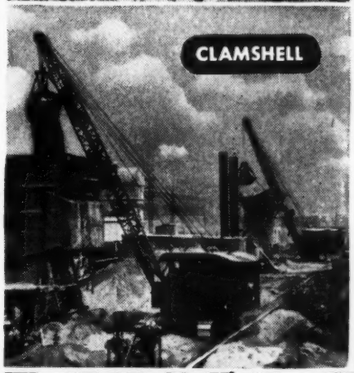
For the Latest in

Pumps . . . Mixers . . .
Concrete Guns . . .
Batching and Placing
Equipment . . . Hoists
. . . Power Saws . . .
Electric Generator
Sets . . .

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

One MACHINE — Many Jobs!





YOUR LINK-BELT SPEEDER "SHOVEL-CRANE" IS THE BUSIEST, MOST USEFUL MACHINE ON THE JOB!

Look at the variety of operations you can do with one Link-Belt Speeder! Clearing the site, excavating, handling materials, placing concrete, erecting steel, driving piles, digging trenches for underground piping, leveling and grading . . . you do all these jobs with the same Link-Belt Speeder unit, by merely shifting from one front-end attachment to another. No wonder the owner of a Link-Belt Speeder values it as a money-maker! Versatile, easy to operate, powerful and rugged, the Link-Belt Speeder has a big place cut out for it—in construction programs now getting under way.

Illustrations are all of the L.S. Eighty-Five, the super ¾ yard machine. Other models up to 3 yards capacity.

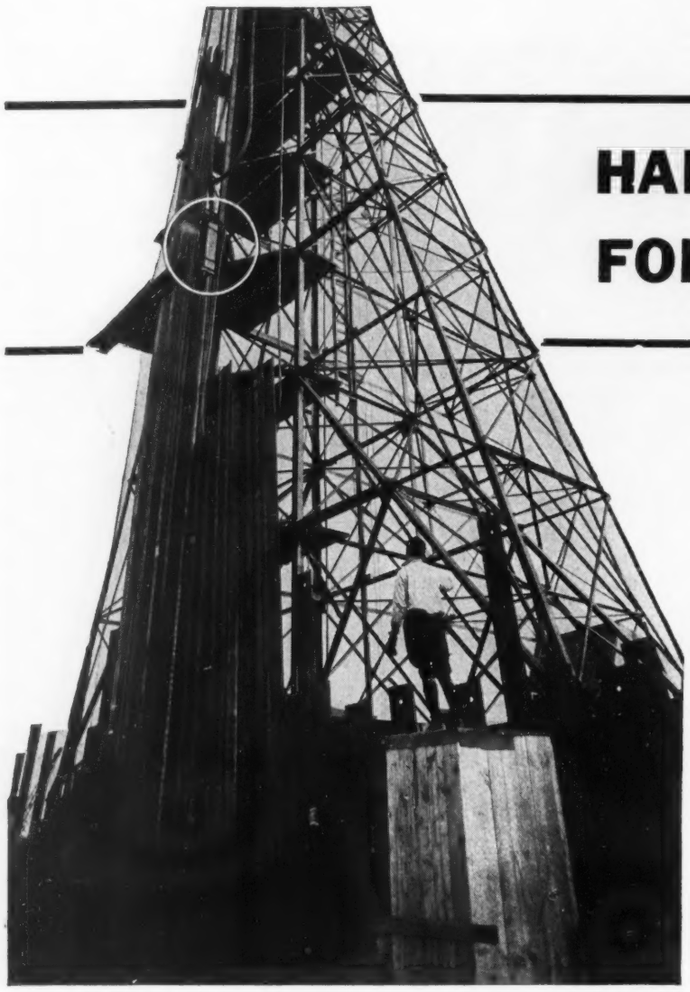
For Prompt, Efficient, Convenient Sales and Service, There is a Link-Belt Speeder Distributor Located Near You.

10.126

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)



HAMMER BLOWS FOR VICTORY

McKiernan-Terry
9-B-3 Double Acting
Pile Hammer

Millions of piles have been driven on shore fronts, at river banks, for dams, and other construction and reconstruction jobs necessary for the advance of Allied Armies in Africa . . . Europe . . . Asia . . . and in the Pacific.

Each pile hammer blow which drove these piles to bed rock has been a blow for Victory . . . and incalculable millions of these blows have been driven by McKiernan-Terry Pile Hammers.

In this war-time work . . . frequently to the accompaniment of enemy fire . . . these "buddies" of Army Engineers and Seabees helped to speed up critical front-line construction jobs where the success of campaigns depended on results.

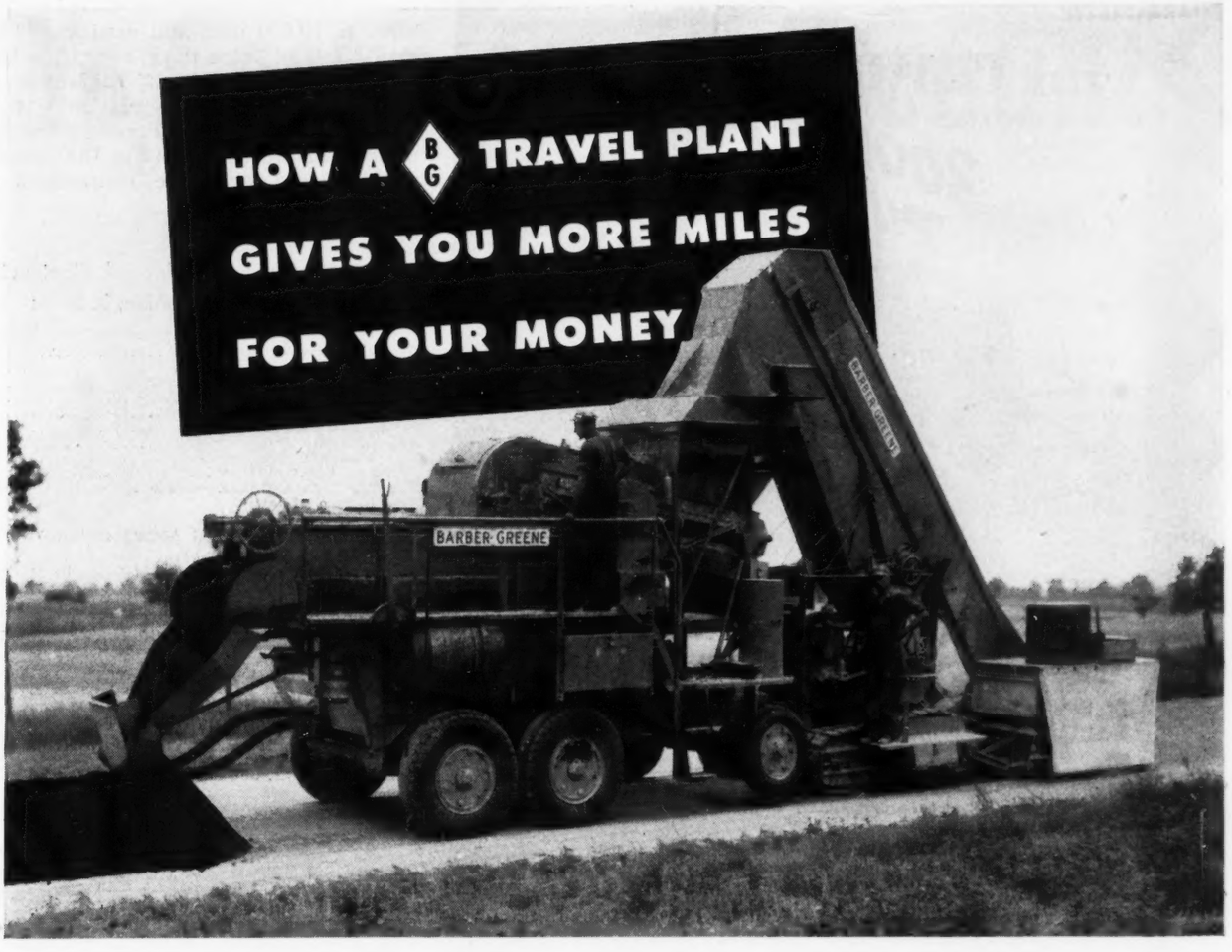
In your post-war work, McKiernan-Terry Pile Hammers . . . and other McKiernan-Terry Products, including hoisting equipment and special construction equipment . . . will be available to help speed up construction of foundations for buildings, bridges and other projects. The greatly expanded manufacturing facilities of the two large McKiernan-Terry plants assures the same speedy production that delivered these machines *when needed* into the hands of our fighting engineers.

Write for Bulletins

Veteran-ize your personnel!
Many discharged war veterans received valuable technical and special ized training. Always consider vet erans when you employ. They did their share—now let's all do ours!

McKiernan-Terry CORPORATION

14 PARK ROW NEW YORK 7, N. Y.



● Building longer lasting asphalt roads is only *one* of the ways a Barber-Greene Travel Plant gives you more for your money.

Here's how a B-G Travel Plant cuts down construction expense to help you stretch limited funds into more miles of completed highways:

*** Continuous, high quality production. No batches, no pauses. No human element to lower capacity . . . no dependence on operating skill to maintain consistency.**

*** Reduction of the weather hazard. No partially-prepared material to be spoiled by sudden showers.**

*** Full working periods. Short mixing cycle permits operation on colder days, later at night, earlier and longer in the season.**

*** No sacrifice of bitumen quality to allow for time-consuming blading. No rich or lean spots. Lower percentages of heavier and quicker-setting bitumen with less solvent produce uniformly-coated mixes.**

*** Easy job coordination. Mixing and proportioning performed by a single unit under control of two or three men. When aggregate is windrowed well ahead, it's automatically available as needed.**

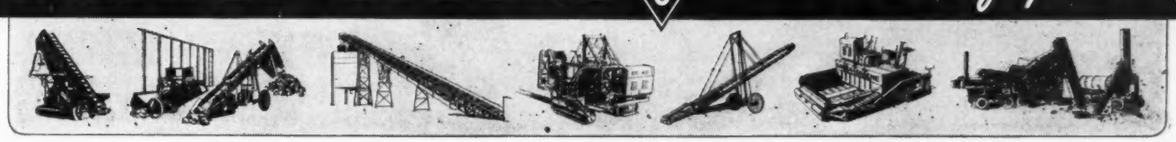
*** Low investment. Cost of the B-G Travel Plant is no more than that of the necessary machines for mixed-in-place construction of the same mileage.**

*** Versatility. Handles all types of bituminous and stabilized work. Can be centrally located for maintenance requirements . . . becomes an integral part of Central Plant set-up for production of high-type mixes.**

Write for catalogs describing how the economical operation of B-G equipment enables you to surface roads with plant-mixed material at blade-mix cost. Barber-Greene Company, Aurora, Illinois.

45-9

Barber-Greene B G *Constant Flow Equipment*



THE CHAMP
WITH A
3000 LB. PUNCH!

Highways have taken a beating! Mile after mile of concrete pavement has been battered by wartime traffic. Repairing and replacing highways will be a big job for both men and machines . . . a job for Champions!

"The CHAMP with a 3,000 lb. PUNCH" . . . the Novo Pavement Breaker is built to speed these vast road-building programs! This mobile unit carries a 3,000 lb. hammer for breaking concrete pavement, bridge approaches, airport runways, and floors in industrial buildings. Special knives for trenching work can easily be attached to the breaking hammer. Mounted on any medium-weight truck, the Novo Pavement Breaker is fast enough for straight-away-breaking . . . at least three to four times faster than air hammers at less than 1/3 the cost! It is accurate enough for spot-repairing, providing full protection for underground installations!

To knock out those tough concrete breaking jobs, get "The CHAMP with a 3,000 PUNCH" . . . a Novo Pavement Breaker.

For complete information about the Novo Pavement Breaker, ask your Novo Distributor or write to the factory for Bulletin No. 221.

Allied Member of A.E.D.

Self Priming Pumps

Hoists

Engines

Diaphragm and Pressure Pumps

NOVO ENGINE CO.

LANSING 5, MICHIGAN

(Continued from page 150)

9,000 to 10,000 men and used 25,000,000 man-hours of work to construct the line. At one time 23 "spreads" (organizations for all pipe laying operations) were working on the line. Pressure welding of the 320-mi. Texas end of the pipeline was handled by three contractors on four spreads.

Work Performed By Principal Contractors
Main Line Construction, in Miles

Bechtel-Dempsey-Price	324
Brown & Root, Inc.	114
J. R. Horrigan Construction Co.	92
Midwestern Engineers	72
Pipe Line Construction Corp.	38
N. A. Saigh Co.	128
Ray L. Smith Construction Co.	58
Swinerton and Walberg	30
Williams Brothers Corp.	404
Pressure Weld Co. (subcontracts for pressure welding on 320 mi. of line)	

RIVER CROSSINGS ABOVE GROUND

Austin Bridge Co.—Buffalo, Dix
Pittsburgh-Des Moines Steel Co.—(Design by Matthews and Kenan) Colorador R. of Texas, Brazos, Sabine, Red, Mississippi.

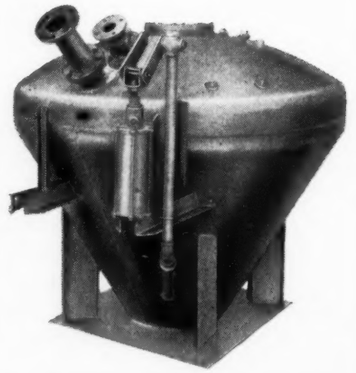
SUBMERGED CROSSINGS OF MAJOR RIVERS

Midwestern Engineers—Ouachita, Big Sandy, Kanawha
Williams Brothers Corp.—Nueces, Guadalupe, Trinity, Neches, Tennessee, Cumberland, Kentucky.

SURVEYING AND MAPPING

Huey and Cage, Monroe, La.; Southern Mapping Co., Greensboro, N. C.; Tobin.
Aerial Survey Co., San Antonio, Texas.

Move Cement by Air-Floating It!



The ROBINSON AIR-ACTIVATED CONVEYOR SYSTEM is practical and efficient, saving in air and maintenance. It has been used on numerous big construction jobs as well as in process plants.

You can order the entire system installed including compressor, piping, storage tanks, etc. or just the activator, such as illustrated, to be used with your own accessory equipment.

Write for illustrated Bulletin No. 310

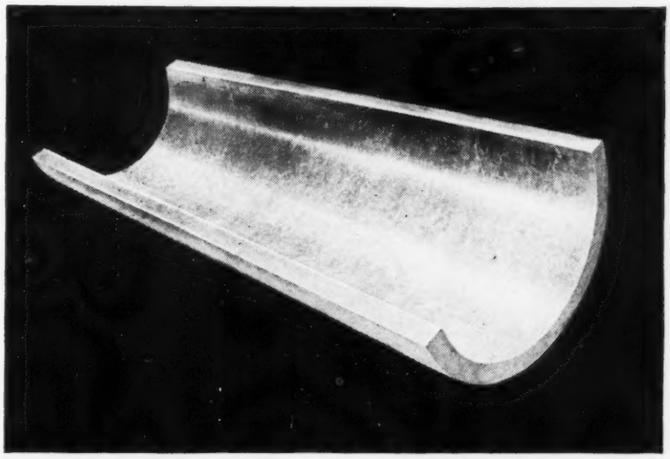
ROBINSON AIR-ACTIVATED CONVEYOR SYSTEMS

Division of MORSE BOULGER DESTRUCTOR CO.
211-C EAST 42nd STREET, NEW YORK 17, N.Y.
Representatives in all Principal Cities

You save on all 3 counts!

low installation costs

In every phase of pipe installation—including handling and assembly—you save with Transite! You save because this light weight pipe requires smaller installation crews . . . needs no mechanical handling equipment except for the larger sizes. Rapid assembly is assured with the Simplex Coupling.



low operating costs

Because of Transite's asbestos-cement composition, its initial high delivery capacity (C=140) can never be reduced by tuberculation. Pumping costs stay low. This advantage often permits use of smaller diameter pipe . . . and ends problems arising from progressive reduction of carrying capacity due to tuberculation.

low maintenance costs

In modern water systems, Transite Pipe provides another important money-saving advantage—low maintenance. Even in highly aggressive soils, it stubbornly resists corrosion. And because Transite cannot tuberculate, the need for periodic cleaning is eliminated—another appreciable maintenance saving.

Booklet TR-11A gives all the facts. Write Johns-Manville, 22 East 40th Street, New York 16, N. Y.

Johns-Manville

TRANSITE PIPE
for efficient, economical water transportation

Nitro Starch Base
HIGH EXPLOSIVE EFFICIENCY
IN MINING · QUARRYING · LOGGING · CONSTRUCTION
Plus THREE ADVANTAGES FOR YOU!
WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!
WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency . . . anywhere . . . anytime!
WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!
Because Trojan Explosives reduce discomfort from breathing muckpile fumes—do not produce headaches from handling—and offer greater safety—they materially improve the efficiency of your workers. They are relied upon for uniform effectiveness under al climatic conditions. You cannot afford to overlook these Trojan advantages.
EXPLOSIVES 1905 TROJAN 1945 CHEMICALS
TROJAN POWDER COMPANY
One of America's Oldest High Explosives Manufacturers
PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION
OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

Anderson Ranch Dam

(Continued from page 116)

the base and 1,350 ft. long at the crest. Its present height is about 300 ft.

8,650,000-Cu. Yd. Embankment—More than 5,000,000 of the 8,650,000 cu.yd. of clay, sand, gravel and rock which will make the dam the highest earthfill structure has been placed. This year's schedule calls for placing 2,000,000 cu.yd. of embankment. The date set for completion of the entire project, which will furnish supplement water for farmland on the Bureau's 324,000-acre Boise Project, is the winter of 1947-48.

★ ★ ★

JOB RIGHTS
Of War Veterans

(Continued from page 97)

status, and pay to that which he vacated."

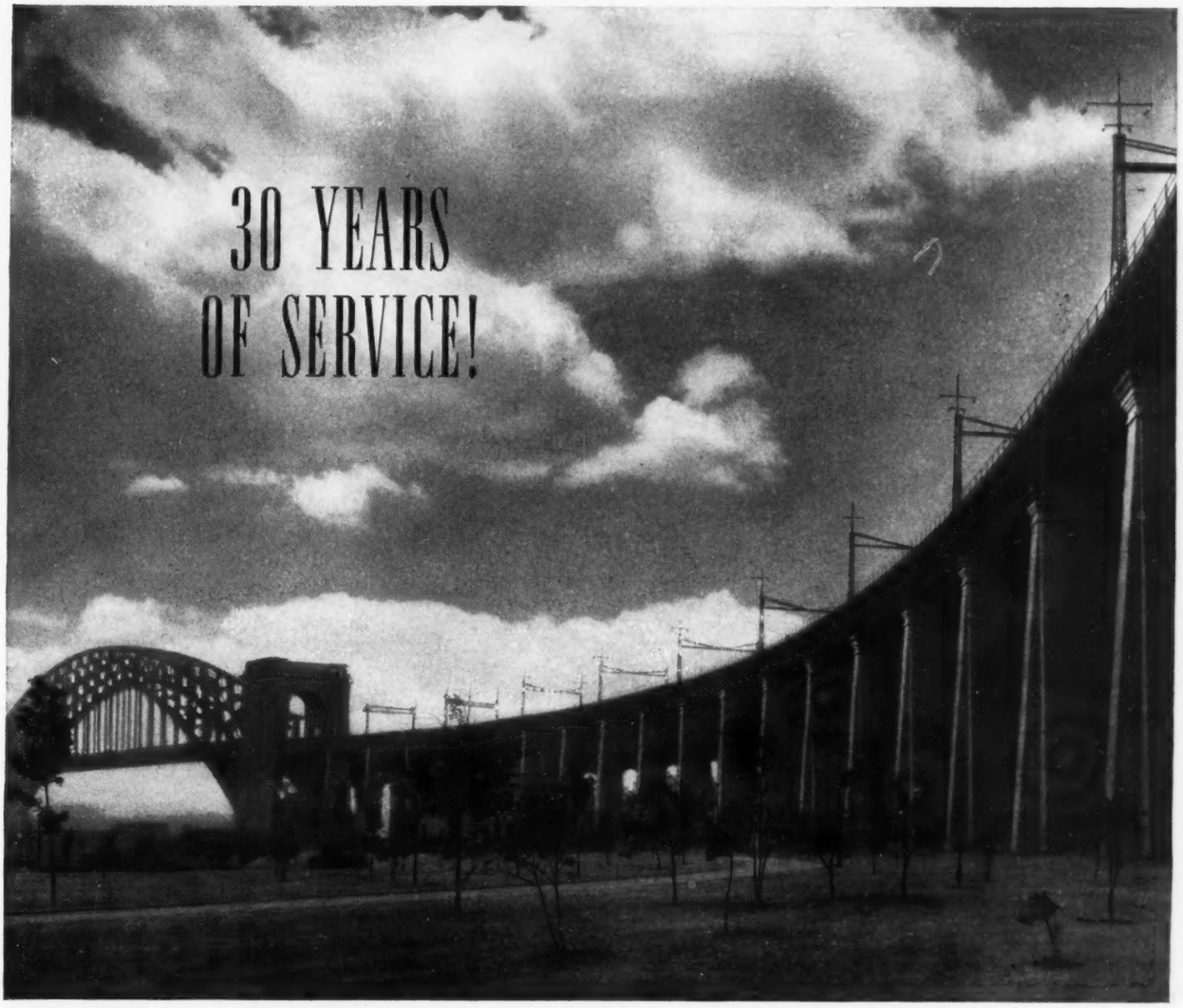
Selective Service has pointed out that veterans returning from military service find themselves, in countless cases, in competition for jobs with persons who have been filling them in their absence and that insomuch as "such competition is not part of a fair and just system," the intention was to eliminate it so far as reasonably possible.

"If the veteran can do his job or can be retrained on the job to perform the duties safely and with acceptable efficiency within a reasonable period of time, he is entitled to be restored to that job," the statement says. "The veteran is entitled to every practicable opportunity to prove that he can perform the duties of the job."

"Temporary" Positions

The only positions not covered by the law are "temporary" positions. By using the phrase "position other than temporary" Congress evidenced an intention of using a broader concept than would have been entailed by use of the word "permanent." Hence, before a veteran is deprived of reemployment rights, it must be shown clearly that the employment he left to enter the armed services was "temporary." In determining whether or not a position was "temporary," all of

(Continued on page 160)



THE FAMOUS HELL GATE BRIDGE IN NEW YORK

Built with
LEHIGH PORTLAND CEMENT

600,000 BARRELS OF LEHIGH NORMAL CEMENT WERE USED ON THIS JOB . . . which, in its entirety, comprises 3 bridges and 11 miles of four-track road of the New York Connecting Railroad.

Completed nearly 30 years ago, the Hell Gate Bridge Unit is still a structural marvel. In 1944 alone, 14,615 passenger trains and 6,978 freight trains were operated over it. Yet its concrete foundations and piers have withstood the severest strains of traffic . . . in peace and in war.

LEHIGH NORMAL CEMENT is a proven product established through many years of successful use on outstanding projects across the country.

Lehigh
CEMENT

WRITE US . . . our Service Department will be glad to help you solve any problems involving cement.

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

SOUTHWEST Hauling Scoop

SINGLE CABLE CONTROL

Here it is—the first rear dump hauling scoop with *single cable control!* No longer is it necessary to have hydraulic equipment to have a rear dump unit. Southwest does it with the single cable control. And here are some of the advantages: Dumps safely over embankments—Works well in difficult places—Dumps while moving forward, backward or standing still—Shortens operational cycles by *controlled* spreading. Sturdy design and construction to handle tough jobs easily. Ideal for road maintenance and repair.

Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A130 Southwest Welding & Manufacturing Company, Alhambra, California.

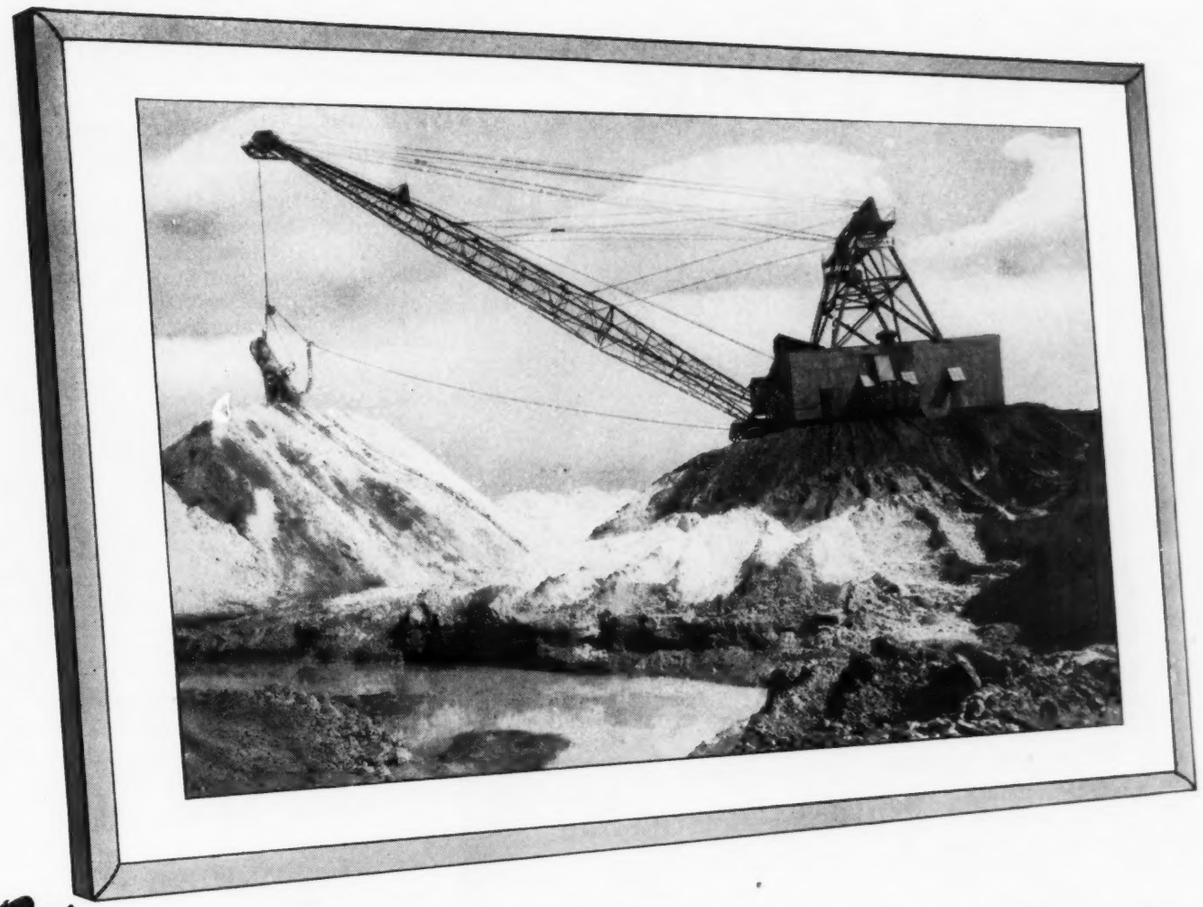
The Southwest Single Cable Control Scoop can be operated by a single drum or as a "dozer scoop" combination with double drum unit.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

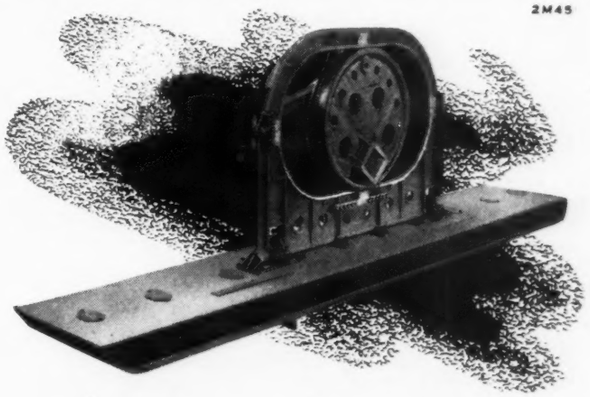
WINCHES BULLDOZERS CRANES TANKS DUMP WAGONS RIPPERS TAMPERS SCRAPERS



Winning Phosphate Output in a Walk!

High water table means a soft, fully-sloughing surface which is one of the big problems in open pit phosphate mining in Florida. For profitable output under these conditions, many leading companies have selected Bucyrus-Monighan and Bucyrus-Erie walking draglines. These "years ahead" machines operate on big-area bases ideal for soft-ground performance. They have smooth rolling-cam walking traction which permits easy moving over soft or rough ground, and side-stepping in any direction to avoid trouble. Long booms fit stripping and matrix-handling; strong, simple construction keeps maintenance costs low. Easy, responsive controls permit the operator to make full use of the speed and balance built into digging, hoisting, swinging, and dumping motions. Available with booms to 250 feet and buckets to 50 yards, these walking draglines have proved their leadership in difficult work all over the world.

2M45



BUCYRUS-ERIE
South Milwaukee, Wisconsin

Keeping a Date with a Sailor

HIGHWAY TRANSPORT . . . VITAL TO VICTORY AND THE AMERICAN WAY OF LIFE

Ever since the first convoy headed overseas, one of Highway Transport's biggest and most important jobs has been Keeping Dates with Sailors.

Fast and flexible, and carrying twice the tonnage of prewar years, motor truck lines have been indispensable to the fast flow of supplies to all fighting fronts. Behind each of these highway haulers, scores of other motor trucks worked overtime to enable farms and factories to make deliveries on time.

When America's fighting strength was being shifted to the Pacific, truck transport was put to even tougher tests. For, in one year, alone, Army shipping schedules called for four times as many supplies for the Pacific as were sent to Europe during all of World War I.

At some time during manufacture, or at some stage of travel to embarkation port, almost every one of 700,000 items of supply traveled by truck.

NEW GMCs . . . ½ TO 20 TONS . . . NOW AVAILABLE

GMC, builder of nearly 600,000 military vehicles, has now turned its full production facilities to the manufacture of commercial vehicles. Civilian GMC trucks are powered by engines of the same basic design as the famous "270" used in the GMC "six-by-six" . . . the "Workhorse of the Army."

INVEST IN VICTORY . . . BUY VICTORY BONDS

GMC TRUCK & COACH DIVISION

General Motors Corporation

Pontiac, Michigan

HOME OF COMMERCIAL GMC TRUCKS AND GM COACHES . . . VOLUME PRODUCER OF GMC ARMY TRUCKS AND AMPHIBIAN "DUCKS"

(Continued from page 156)

the facts and circumstances relating to the employment relationship must be considered. In all borderline cases the doubt as to whether the position left by the veteran was temporary should be resolved in favor of the veteran.

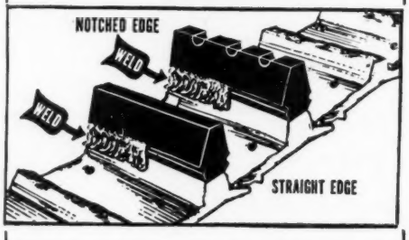
Work performed on a part-time rather than a full-time basis does not necessarily render the position a temporary one. The question of whether a position is or is not a temporary position cannot be resolved solely on the basis of the number of hours worked per day or per week. If the part-time work is not short term but involves the performance of regular continuing service for an indefinite period, it is not a temporary position.

Selective Service declares that apprentices or trainees as such are not temporary employees. "These terms," it is asserted, "have no bearing on the question of whether or not the position is in fact a temporary position. A person may be an apprentice, a trainee, a helper, or a journeyman, and be either a temporary or other than temporary employee, depending upon the terms and purpose of the employment relationship."

(Continued on page 164)

Rebuild your

TRACTOR GROUSERS WITH BULLDOG Grip-Lugs



Easily Welded

ECONOMICAL

GIVES MORE PULLING POWER

See your local Equipment Dealer

Send for Folder CM

ALLIED STEEL PRODUCTS, Inc.

7835 Broadway

CLEVELAND 5 OHIO, U. S. A.

10 *reasons why* Heil Cable Dozers

move more "pay dirt" at less cost

1 The center-lift construction assures full visibility for operator. He works faster and more accurately, for 60% of moldboard is visible at all times.

2 Ease of operation is assured because control lever is located at driver's side.

3 Lifting mechanism is mounted on tractor frame—heavy reinforcing fish plates attached to transmission case and engine frame carry load of overhead center lifting mechanism.

4 Heil design transfers imposed load to dead axle — no strain on tractor frame.

5 Short push arms at center balance point provide greater down-pushing pressure on blade cutting edge.

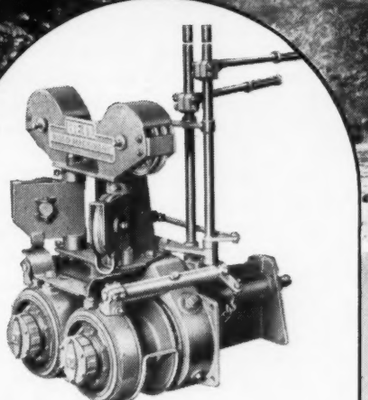
6 Down pressure at center point of tractor keeps track at full length on ground, utilizing entire drawbar horsepower of tractor.

7 Blade can be disconnected from tractor easily. Simply remove one sheave pin and four small nuts—tractor can be backed away from blade with cable remaining intact.

8 Mounting frame leaves whole track frame clean — does not cause dirt to accumulate at idler rollers.

9 Fast mounting job is possible because Heil equipment has a minimum of pieces and weight. Parts are interchangeable—which means less inventory.

10 Heil streamlined design does not detract from the tractor's appearance. All functions are coordinated to give you smoother operation, quick response to controls, and a better, cleaner, all-around job of dirt-moving at lower cost.



Dependable Power Control Units for All Makes of Tractors

Smooth operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; sheaves are designed to reduce wear on cables. Fingertip control gives fast response for bigger yardage. Designed for all types of cable-operated equipment, on all makes of tractors.

Write for bulletins.

A Heil Cable Dozer gives you faster action, greater flexibility and handles the tough jobs easily.

See Your **INTERNATIONAL TRACTRACTOR DISTRIBUTOR**

R-55

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

HYDROTARDER SAVED $100 PER MONTH ON BRAKES ALONE

If you're operating trucks in hilly country or on off-the-road jobs where braking is a problem—the Parkersburg Hydrotarder is the answer to your troubles.

For example, one operator's figures on two installations on logging jobs in British Columbia show the Hydrotarder is saving $100 per month, per truck, on brakes alone. In addition there are less obvious but equally important savings on oil, gas, tires and wear and tear on engines and transmissions. The same operator also gives high praise to the extra safety the Hydrotarder provides. He says, in part, "It makes it impossible for a truck to get out of control on the steepest grades."

On another logging job the brake linings on a Hydrotarder-equipped truck showed less than one-eighth inch wear after a whole season. Other trucks on the same job were ready for their fourth brake relining job.

Write today and find out what the Hydrotarder can do towards licking **your** braking problems.

One of many logging trucks operating with greater safety, economy and speed as a result of being equipped with Parkersburg Hydrotarder.

Parkersburg
HYDROTARDER

THE PARKERSBURG RIG & REEL COMPANY
PARKERSBURG, W. VA.

Manufacturers since 1931 of the famed Hydromatic Brake—the load retarder which makes possible the drilling of deep oil wells safely and economically. Its counterpart, the Hydrotarder, enables motor transportation to operate with greater safety, economy, and speed than was ever heretofore believed possible

Distributed by

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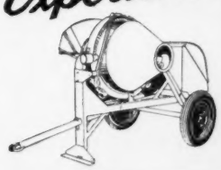
Engineers and Manufacturers
1972 Los Angeles Street, Los Angeles 11, California

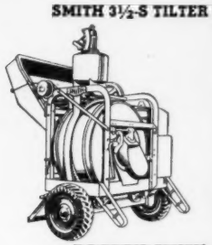
THE WINTER-WEISS COMPANY
22nd and Blake Sts., Denver 2, Colorado

The Pointer-Willamette Company
238 N. E. Oregon St., Portland 14, Oregon

46 Years of Mixer Building Experience

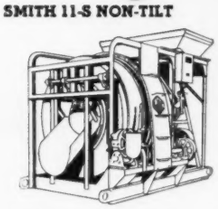


SMITH 3½-S TILTER

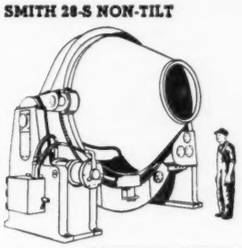


7-S TRAIL-SMITH

SMITH 11-S NON-TILT



SMITH 28-S NON-TILT



SMITH 112-S TILTER

SMITH-MOBILE TRUCK MIXER

New SMITH 16-S

Faster, Streamlined Mixer FOR *Tomorrow's Concrete Jobs!*

Modern...like an autogiro...the new Smith 16-S is just the mixer you've been waiting for. Combines smart, streamlined appearance with maximum utility. Here are only a few of its many advanced, time-tested features:

Arc-welded unit box-girder frame . . . Individual wheel springing (knee action) . . . Engine direct-connected to unit transmission incorporating skip hoist . . . Reduction gears running in oil-tight case . . . Self-priming, centrifugal water pump direct-connected to transmission case (optional equipment) . . . Open end, streamlined skip . . . Skip vibrator with enclosed working parts . . . Accurate syphon-type water measuring tank . . . Spring stabilizers for charging and mixing cycles . . . Anti-friction bearing equipped drum rollers.

And, of course, this new 16-S has the famous Smith drum with its fast discharge and easy rolling "end-to-center" mixing action. Available with batchhopper or feed chute, if desired. Write for literature.

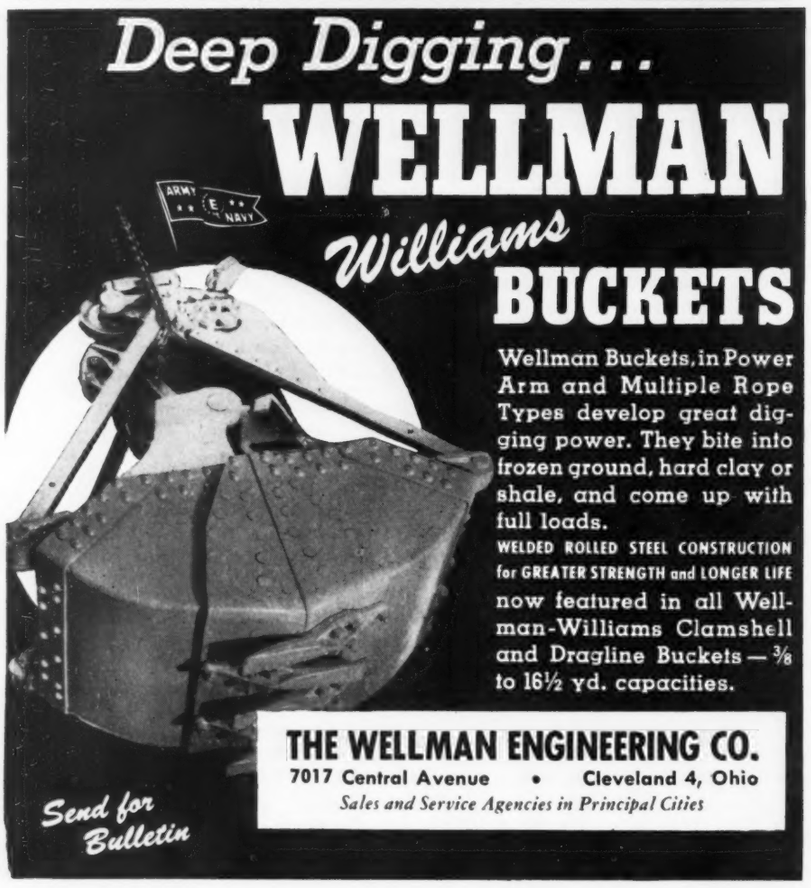
The T. L. SMITH COMPANY, 2851 N. 32nd St., Milwaukee 10, Wis., U.S.A.

SMITH
T. L. SMITH CO. MILWAUKEE U.S.A.

CONCRETE MIXERS

Famous for Performance on the World's Greatest Projects

DRAG IT,
SCUFF IT,
TWIST IT!
YOU CAN'T HURT
THE LUFKIN
"ANCHOR" CHROME
CLAD STEEL TAPE
CHROME CLAD
EASY TO READ
MARKINGS
THAT ARE DURABLE
The roughest, toughest measuring work can't hurt the Lufkin "Anchor" Chrome Clad Steel Tape. Drag it—twist it—scuff it—you can't damage the satin chrome finish of the husky line. Jet black markings are easy to read—they're recessed so they can't wear out. Available with hook ring for one-man measuring. See the "Anchor" at your dealer's. For free catalog write THE LUFKIN RULE CO., SAGINAW, MICH., New York City.
LUFKIN FOR ACCURACY


Deep Digging...
WELLMAN
Williams
BUCKETS
ARMY
E
NAVY
Wellman Buckets, in Power Arm and Multiple Rope Types develop great digging power. They bite into frozen ground, hard clay or shale, and come up with full loads.
WELDED ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and LONGER LIFE now featured in all Wellman-Williams Clamshell and Dragline Buckets — ⅜ to 16½ yd. capacities.
THE WELLMAN ENGINEERING CO.
7017 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities
Send for Bulletin

Nine-Span Bridge

(Continued from page 109)

the spans from the river bottom by means of a grapple on the load line of a derrick, burning off sections as large as 10 tons and carrying them to shore by boat.

Four of the five spans dropped into the river were removed in 10 working days by seven workers under the direction ot one foreman.

Span Over Railroad

Removal of a 115-ft. span over the Burlington R.R. main line proved to be a difficult task because of the time limitation and precision work involved. The span had to be removed in 1 hr., 50 min. —the time between trains. To avoid damaging railroad property, planks were placed over the tracks, and the entire span was lowered on to the planking by winches. This span and one similar to it were removed intact and re-used later as highway bridge superstructures.

Entire demolition of the Dubuque bridge was completed in seven months. William Peterson was foreman in charge of the steel removal crew for M. E. Souther, Inc., contractor.

★ ★ ★

Subcontractor Does Outstanding Job on Atomic Bomb Project

WORD FROM COL. F. T. MATTHIAS concerning recognition of an outstanding job done by the principal subcontractor on the Atomic bomb project at Hanford Engineer Works in the State of Washington corrects a statement made in *Construction Methods*, Sept. 1945, page 168.

According to Col. Matthias the Morrison-Knudsen Co. were engaged as subcontractors on two contracts which represented only a small percentage of the total contract work done on the project. The largest subcontract job carried out under the supervision of E. I. du Pont de Nemours & Co., under control of the Corps of Engineers, was by the Smith, Hoffman & Wright Co. of Portland, Ore., which did an outstanding job at Hanford in building most of the Richland operating village.

Better Trucks for YOUR Business!

"Rugged FORD Construction" Aided Finney Bros. in Tough War Task

Back in April, 1941, Paul and Charles Finney put their 3 Ford Dump trucks to work at Silverville, Indiana, hauling crushed stone over rough, hilly country from quarries to road and munitions plant building sites. By August, 1942, the fleet had grown to 68 Ford Dump trucks and a half-ton pickup. According to Finney Brothers:

"The highest average of trucks out of service for repairs at any one time was approximately 5 per cent of the fleet. Rugged, safe Ford construction enabled Finney Brothers to fulfill their pledge to the war effort to 'keep 'em rolling.'"

New Ford Trucks are being built, and are available in the more popular models. They're the best in Ford history—better performing, more enduring, more economical. Order your new ones now, for earliest delivery.

Ford

ADVANCED ENGINEERING IN NEW FORD TRUCKS

More Economy and Endurance
Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground 4-ring pistons for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW longer-lived valve springs • NEW improvements in cooling • NEW efficiency in ignition • in carburetion • in lubrication • in ease and economy of servicing operations • And available in all truck chassis except C.O.E. units—the rugged, thrifty 90 HP FORD SIX-CYLINDER ENGINE, with many important advancements.

FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Tough, forged front axles • Extra-sturdy rear axles with pinion straddle-mounted on 3 large roller bearings, ¾-floating type in light duty units, full-floating in all others • 3 axle ratios available (2 in 1-ton unit) • 2-speed axle available in heavy duty units at extra cost • Powerful hydraulic brakes, large drums, cast braking surfaces • Rugged 4-speed transmission with NEW internal reverse lock optional at extra cost on light duty units, standard on all others.

FORD TRUCKS

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

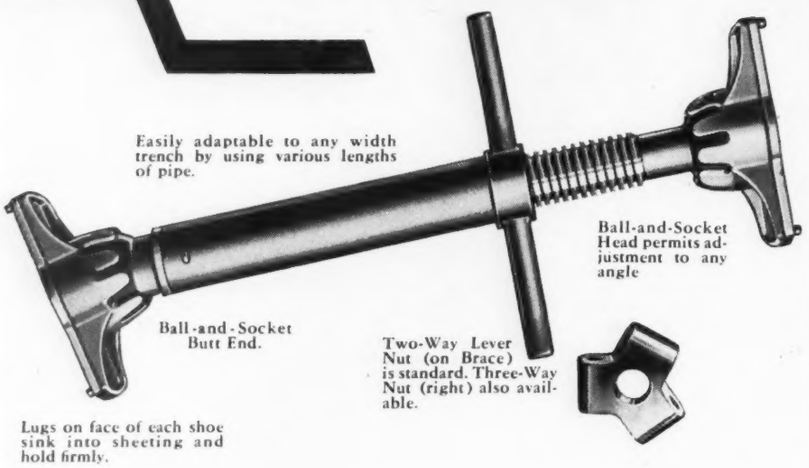
SPEED SHORING WORK

prevent cave-ins

with **DUFF-NORTON**

EXTENSIBLE STEEL

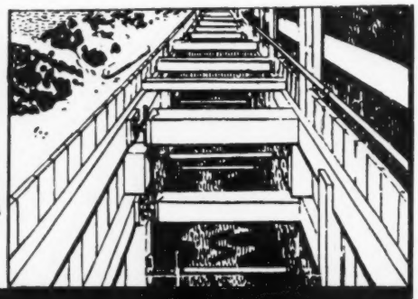
TRENCH BRACES


Easily adaptable to any width trench by using various lengths of pipe.
Ball-and-Socket Head permits adjustment to any angle
Ball-and-Socket Butt End.
Two-Way Lever Nut (on Brace) is standard. Three-Way Nut (right) also available.
Lugs on face of each shoe sink into sheeting and hold firmly.

Duff-Norton Extensible Steel Trench Braces are ideal for all your trench bracing work. Readily adjustable to any length, sturdy and safe, they hold firmly regardless of unevenness of trench. These Braces speed up shoring—prevent cave-ins—step up safety on construction projects.

Duff-Norton Trench Braces are available as complete units (as illustrated above), as separate fittings, for attachment to timbers. Write for descriptive literature.

ADAPTABLE TO EVERY TYPE OF BRACING AND SHORING IN WIDE OR NARROW DEEP OR SHALLOW TRENCHES OR EXCAVATIONS



THE DUFF-NORTON MANUFACTURING CO.
PITTSBURGH, PA.

Canadian Plant:
COATICOOK, QUE.

Representatives and Jobbers Everywhere

Access Road in Costa Rica

(Continued from page 89)

Administration, additional heavy equipment was obtained from Army depots in the Panama Canal Zone.

Surveys and initial construction activities on the access road were under way by late July. The work continued through the rainy season without serious interruption, although the rains during the summer and fall were exceptionally heavy. Precipitation in a single month amounted to 40 in. The plantation area has an annual rainfall of approximately 250 in.

Weather Hampers Progress

Road-building operations were hampered by heavy rains and by frequent landslides on steep slopes above the right-of-way. In some sections heavy

(Continued on page 168)

Shunk *Snow Plow and Ice Removal* **BLADES**

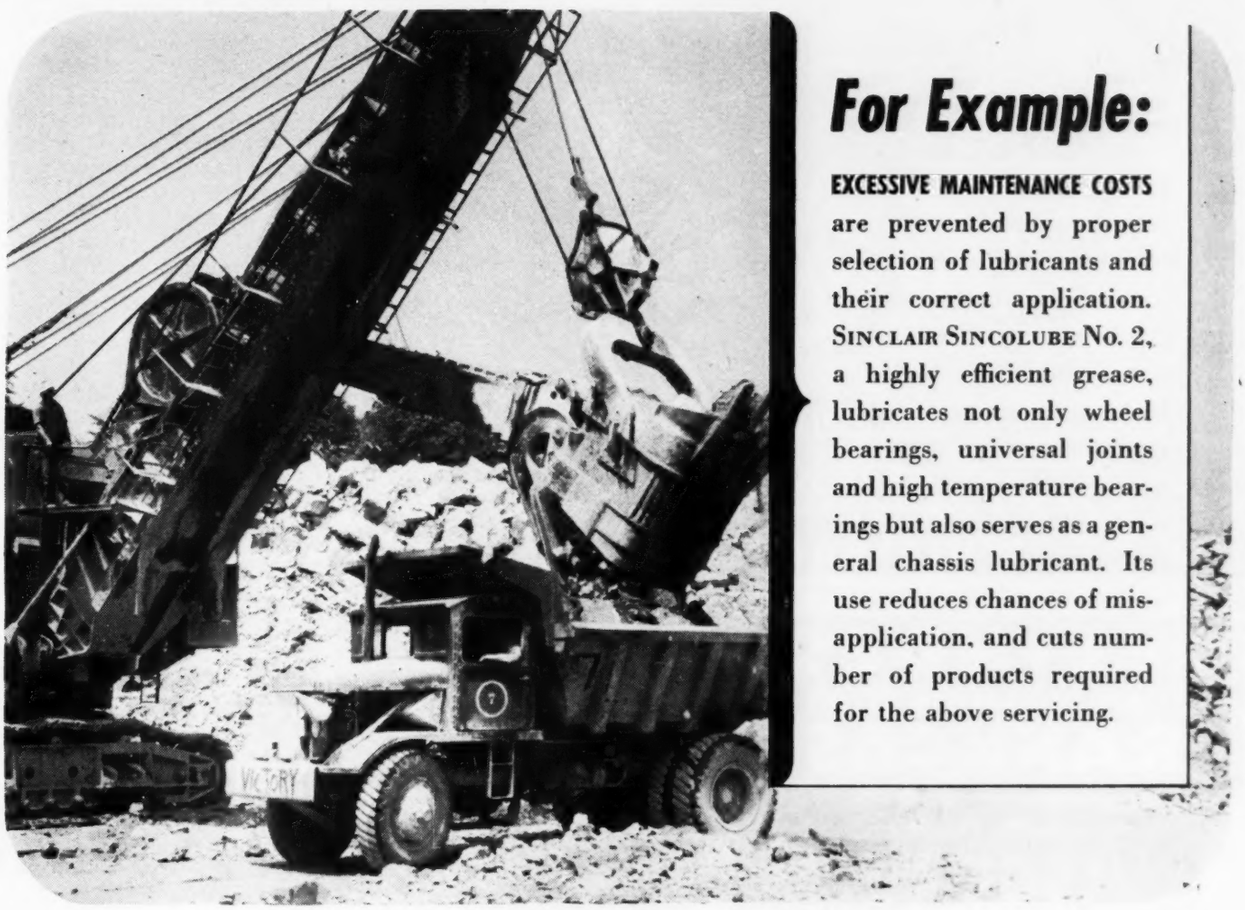
Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.

FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses--flat or curved--standard or special--punched ready to fit your machine.

SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.

Shunk
MANUFACTURING COMPANY
ESTABLISHED 1854
BUCYRUS, OHIO.

SINCLAIR has the Answers to Your Lubrication Problems



For Example:

EXCESSIVE MAINTENANCE COSTS are prevented by proper selection of lubricants and their correct application. SINCLAIR SINCOLUBE No. 2, a highly efficient grease, lubricates not only wheel bearings, universal joints and high temperature bearings but also serves as a general chassis lubricant. Its use reduces chances of misapplication, and cuts number of products required for the above servicing.

OLDEST CRUDES MAKE FINEST LUBRICANTS

SINCOLUBE No. 2 is one of a group of Sinclair lubricants specially suited to the requirements of equipment in heavy duty service. These lubricants provide correct lubrication for all types of road-builders' and contractors' machinery with a small inventory of oils and greases. Sinclair offers a chart showing how simplified lubrication can be applied in your operations to reduce lubrication and maintenance costs and also extend life of equipment. Write for a copy.

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Easy WHEELING IN ANY WEATHER!

Rain or shine, you can always depend on Sterling performance. That's because Sterlings are "EASY-WHEELING" barrows, veterans of long, successful service in fields of construction and throughout industry. A limited number of all-steel tubular barrows is now available. (Sorry . . . we will not be in a position to ship wood-handled barrows for some time to come.)

No. S8 RF

Narrow, 3½ cu. ft. struck capacity tray, 16 gauge steel — all-welded — no rivets — lapped at corners — steel reinforcing rod around top edge — V front braces and cross supports. Pneumatic tires, if desired. Ideal for construction work or industrial hauling. Write for circular.

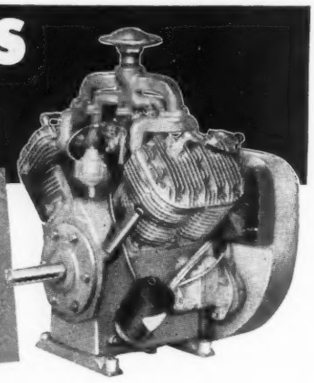
STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

CYLINDERS are separate from CRANKCASE

ON ALL **WISCONSIN** 4-Cylinder V-Type Air-Cooled **ENGINES**



The cylinders on all V-type Wisconsin Air-Cooled Engines are cast in pairs, separate from the crankcase, for quick, economical servicing when required. In case a cylinder is accidentally scored beyond the possibility of reboring, it is only necessary to replace a relatively inexpensive pair of cylinders instead of an entire engine block. The picture shows the Model VE-4 Wisconsin Engine, with protective shrouding removed, illustrating method of attaching cylinders.

Most H.P. per pound

WISCONSIN MOTOR Corporation

MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

(Continued from page 166)

equipment bogged down and it was necessary to remove mud from the roadbed by hand labor. But in spite of these difficulties surveys were completed in November and by the middle of March the road was graded and surfaced along its entire length. By the end of March the last bolt had been fastened in the treated-timber bridge that spans La Paz Grande River just below a point where the stream cascades over a 30-ft. fall.

A heavy stone base and crushed-stone macadam surface were used in construction of the road. The stone was obtained from old quarries in the vicinity, where rock crushers were set up to produce the surfacing material. Concrete aggregate for the bridge abutments also was manufactured on the job.

The road is 16.4 ft. wide, with 3-ft. shoulders, and its maximum grade is 12 percent. The highest point on the road, near its junction with the Poas Volcano road, a branch of the Inter-American Highway, is approximately 5,800 ft. Over this access road and along the Poas Volcano road and the Inter-American Highway, bales of the bitter cinchona bark eventually will be hauled to San Jose for shipment to processing plants where the quinine will be extracted.

★ ★ ★

New Method Of Handling Construction Equipment

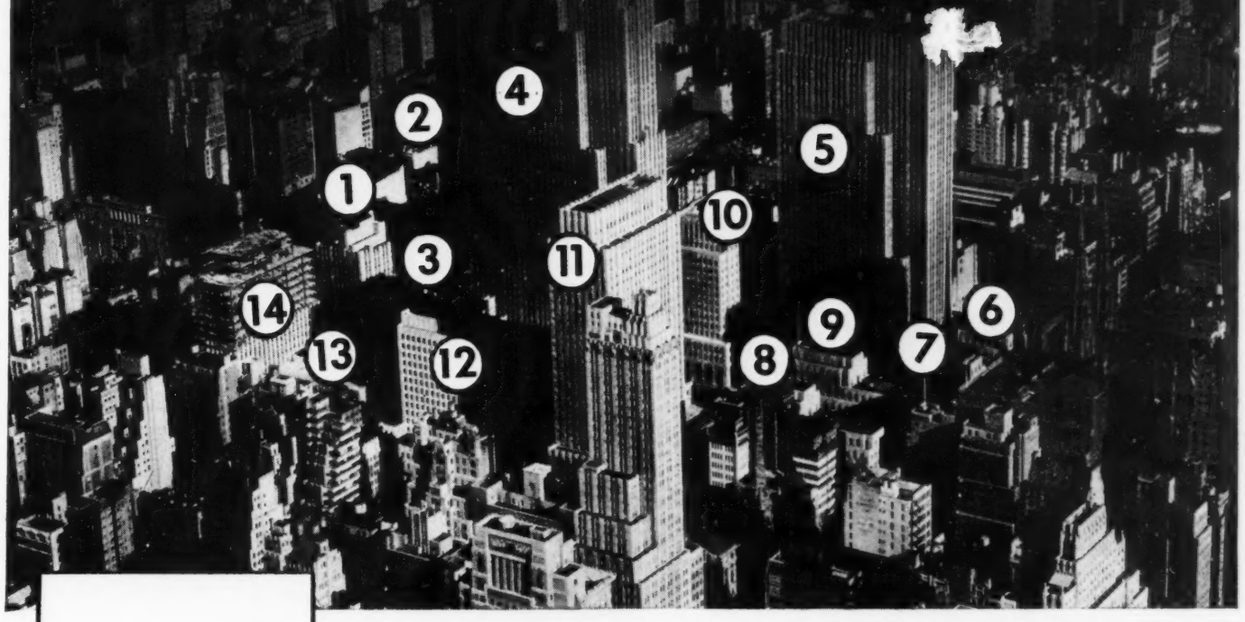
(Continued from page 85)

space, the LST (landing ship, tank) is one of the more versatile landing craft developed during the war. It has a shallow draft, requiring but 3½ ft. of water forward and 12 ft. aft for beaching and unloading through a gate in the bow. With an overall length of 328 ft. and a top width of 50 ft. a maximum load of about 2,100 ship tons or 600 weight tons, depending on the type of cargo, can be carried. In addition to its cargo the LST will accommodate 200 men, exclusive of crew, on an ocean voyage.

As an example of the type and quan-

(Continued on page 170)

For the World's Outstanding Buildings* the most widely used concrete reinforcement



★ (1) R.C.A. Building West. (2) R.K.O. Building. (3) Radio City Music Hall. (4) R.C.A. Building. (5) International Building. (6) International Building, North. (7) International Building, South. (8) La Maison Française. (9) British Empire Building. (10) Associated Press Building. (11) Time and Life Building. (12) Eastern Air Lines Building. (13) Center Theatre. (14) United States Rubber Company Building.

SHORT span concrete floors reinforced with U·S·S American Welded Wire Fabric are used throughout all 14 buildings of Rockefeller Center, New York City.

In this world famous center, a city in itself, the architects specified American Welded Wire Fabric for concrete reinforcement. And in hundreds of the world's other outstanding structures, the same material is keeping concrete floors, roofs and walls safe, strong, fireproof—through the years.

Adaptable to most types of construction, from thin-section precast building products to wide airport and highway ground slabs, American Welded Wire Fabric reinforcement is supplied in either rolls or flat sheets. It is made of cold drawn, round, steel, high yield point wire, prefabricated by electric welding.

The successful history of American Welded Wire Fabric indicates that it will play an important part in the future's new developments in concrete construction. When you are planning familiar—or hitherto unknown—applications of reinforced concrete, make sure that you specify the practical, efficient, economical reinforcement, U·S·S American Welded Wire Fabric.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

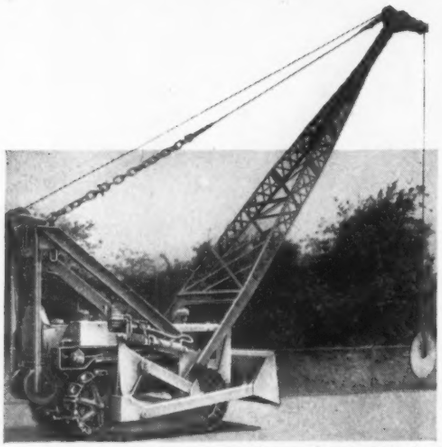
U·S·S American Welded Wire Fabric

AMERICAN STEEL & WIRE COMPANY ★ USS STEEL ★ UNITED STATES STEEL

MERCER

Material Handling Equipment

"THE NAME THAT CARRIES WEIGHT"



A special Mercer Crane unit mounted on a track type tractor. This is but one of the many special job problems solved by the Mercer engineering department.

Special Handling Equipment for the Construction Industry

Gas powered Wheel Tractor Cranes (3, 5 and 7 ton capacities).

Various length booms. Various types of boomheads. Auxiliary service attachments (snowplows, etc.).

Tool Wagons, Utility Carts, Tractor Trucks . . . Material Handling Equipment of every type. Designed to your requirements by experienced engineers. Literature available. Inquiries invited!

Sole Representatives
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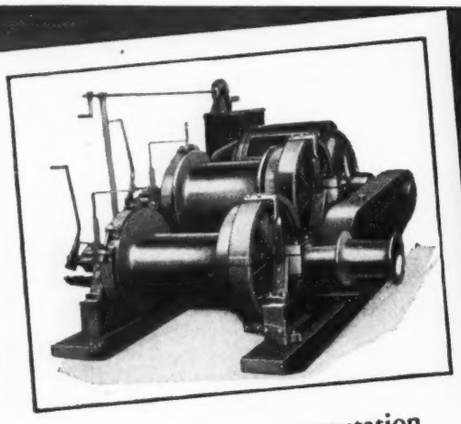
MERCER ENGINEERING WORKS, Inc.

WORKS: CLIFTON (ALLWOOD) N. J.

Hoists to Fit the Job



Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire *first* of LIDGERWOOD.

HOISTS FOR:
CABLEWAYS
INDUSTRIAL PLANTS
CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS • ELIZABETH, NEW JERSEY

(Continued from page 168)

tity of cargo which one LST can carry, the following is a typical loading used by Aviation Engineer battalions:

11—2½-ton dump trucks	1—20-ton trailer
4—4-ton dump trucks	1—20-ton trailer-crane
5—Jeeps	3—Motor patrol graders
1—Asphalt heater	4—D7 bulldozers
1—Asphalt distributor	2—8-yd. scrapers
1—Truck-mounted welding shop	1—7-ton truck-mounted crane
1—750-gal. gasoline truck	1—Lubrication truck
1—Trailer-mounted water pump	1—Case tractor
3—250-gal. water trailers	1—Truck-mounted repair shop
1—Barber-Greene ditching machine	1—Motorized air compressor
1—¾-yd. shovel	150—Weight tons of general construction materials

The greatest advantage of the LST is that all items of heavy equipment can be discharged directly on to the beach without intermediate handling or lightering, obviating the need for heavy ship or dock cranes to handle loads up to 15 tons. The average ocean-going freighter cannot handle such loads; thus in prewar days it was necessary to disassemble such heavy equipment and reassemble it ashore—a time wasting process.

Other Landing Craft

LCT and LCM are the common appellations for the landing craft, tank, and landing craft, medium. Unlike the LST, these vessels are not ocean going, but are designed primarily for ferrying between a freighter off shore and a shallow-water beach. For practical purposes they may be considered as improved, self-propelled barges. The larger of the two, the LCT, has a length of 108 ft. and a beam of 32 ft. Carrying a maximum of about 90 weight tons of cargo it draws approximately 3 ft. of water forward and 4 ft. aft. Thus it can unload the heaviest construction machinery in very shallow water.

Having a length of 50 ft. and a beam of 14 ft., the LCM carries about 60 weight tons of cargo and draws from 3 to 4 ft. of water. Although it can handle the heaviest piece of equipment, width is likely to be the critical factor. Neither the 12-yd. carryall nor the heavy shovels can be accommodated. However it will take an 8-yd. scraper or a D7 with attached bulldozer blade. With slight modifications the D8 with blade can be handled.

Both the LCT and LCM are normally loaded off shore, the cargo being transferred from a freighter. Successful transfer of cargo can be accomplished in open

(Continued on page 172)

ATKINS

FAST-CUTTING SAWS for FAST-MOVING JOBS!

It's almost unbelievable—until you see it for yourself—how Atkins Saws keep work moving at a fast pace.

Take circular blades for your portable power saws. They have what it takes to turn out faster, cleaner cuts and stand up under tough, day-after-day usage.

The same is true of all saws in the Atkins line. Each is designed for peak efficiency for its intended purpose. Each represents the best in saw steel, made with the finest workmanship. No wonder so many workmen team up with Atkins. They like the saws that keep cutting for longer periods of time . . . give more cuts per blade, with fewer time-outs for filing.

ATKINS CIRCULAR SAWS
The Atkins No. 37 Mitre Tooth Saw shown above is unsurpassed for general work. Used for portable power saws or saw tables, it is typical of the full line of Atkins Silver Steel Circular Saws. Each is famous for its ability to cut cleanly at high speeds, and turn out more work with less filing.

FOR EVERY JOB!
Atkins has the type and quality of saw to meet your every need. In addition to the saws shown, the Atkins line includes Hacksaws and Blades, Docking Saws, Hand Saws, Chain Saws and many special types. Find out about them now.

ATKINS CROSSCUT SAWS

Well-liked for heavy-duty cutting of timbers, piling, etc., Atkins One-Man and Two-Man Crosscut Saws are all made of the finest saw steel, which gives them unusual edge-holding qualities. Shown is the No. 392 Victor Chippewa One-Man Saw, a favorite with men who appreciate fine saws.

E. C. ATKINS AND COMPANY • 485 S. Illinois St., Indianapolis 9, Indiana
Agents and Dealers in All Principal Cities the World Over

ATKINS

Manufacturers of Better Saws for Every Cutting Job

(Continued from page 170)

seas if the water is not too rough. These craft when firmly beached can successfully combat cross currents and surf while unloading. In particularly strong cross currents or heavy surf, however, the LCM may require guy lines to shore while discharging cargo. The LCM can be conveniently transported in an LST to the unloading area.

Other new types of landing craft which the engineer may utilize upon occasion are the amphibious truck and the amphibious tractor, which are useful as personnel and light cargo landing craft for ferrying purposes; and the LSD, or landing ship, dock, for transporting pre-loaded LCM's to an unloading area.

Proper Types of Cranes

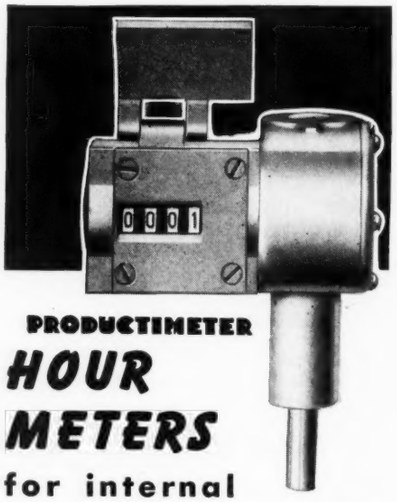
In opening a new construction project in an area lacking in docks and cargo-handling facilities, an adequate number and the proper types of cranes are essential for unloading heavy construction equipment and materials. At least one crane of 15-ton capacity, or more, should be provided for handling non-mobile construction plant, if such will be present. Normally even the heaviest items can be disassembled so as to have 15-ton maximum lifts. The tractor-operated 20-ton

(Continued on page 174)

We know the problems that threaten your profit on many jobs . . . unexpected tight spots, soft ground, hard pan, to mention only a few. That's why, feature by feature, we designed the Insley Excavator to work on any terrain, in close quarters . . . to take the "tight spots and tough going" in its stride. That's why you can count on an Insley Excavator to help you whip every difficulty, to get your job done . . . in less time . . . with greater profit for you.

From now on there'll be plenty of Insley Excavators to assure you profit on your "bids." Contact your Insley Dealer today about a new ⅜ or ½-yd. Insley Excavator. Designed for five interchangeable attachments—shovel, crane, hoe, clamshell and dragline.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.



PRODUCTIMETER
HOUR METERS
for internal combustion engines

register actual running hours of operation, just as a speedometer registers mileage. Specially applicable to gas or Diesel engines, Hour Meters provide valuable readings that enable owners and operators to maintain motorized construction equipment at highest efficiency. Use them on compressors, graders, mixers, tractors, bulldozers.

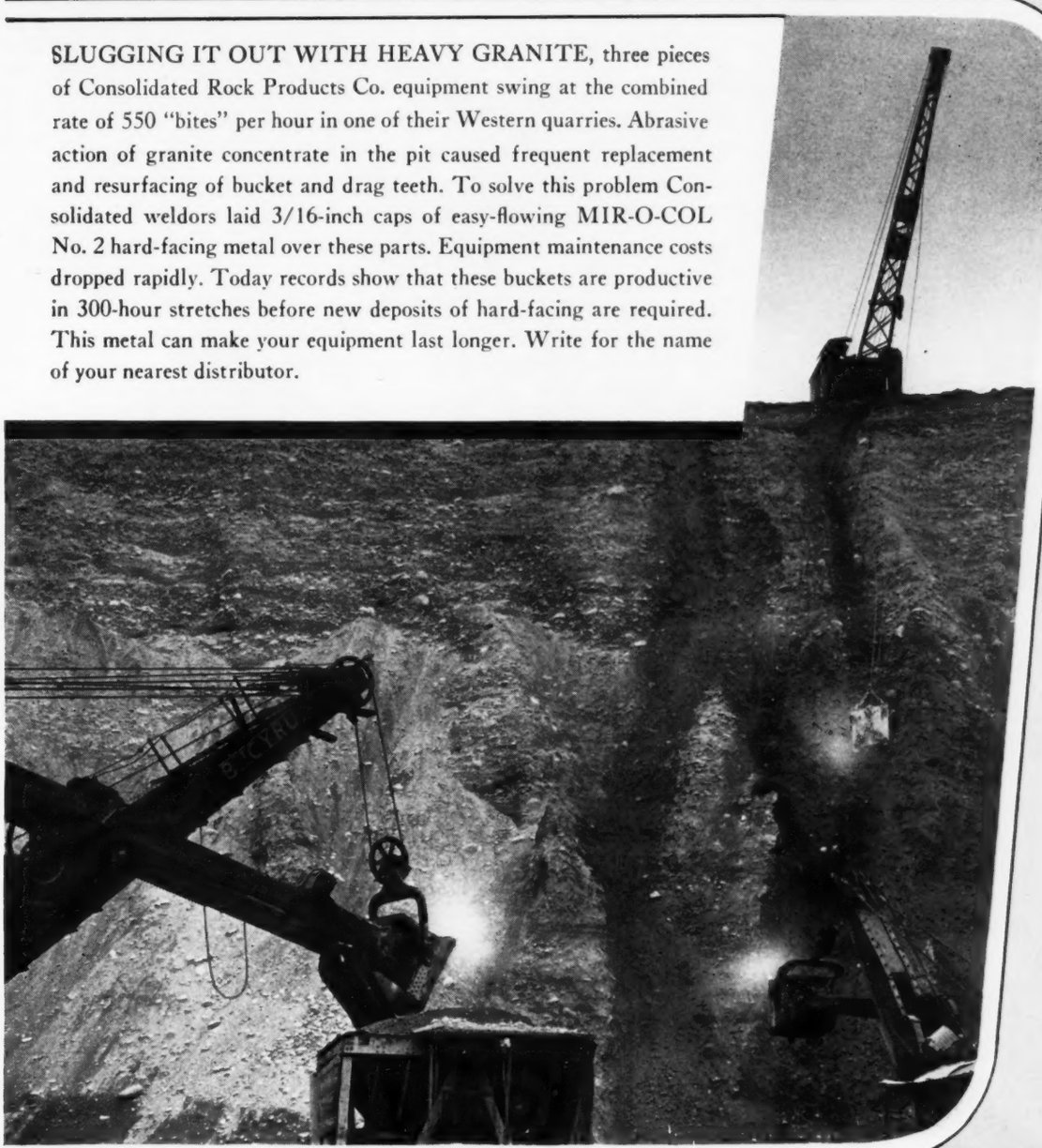
Compact, easily adaptable . . . send for complete details in

Catalog No. 20

DURANT MFG. COMPANY
1980 N. Buffum St. Milwaukee 1, Wis.

Hard-Faced FOR A TOUGH JOB

SLUGGING IT OUT WITH HEAVY GRANITE, three pieces of Consolidated Rock Products Co. equipment swing at the combined rate of 550 "bites" per hour in one of their Western quarries. Abrasive action of granite concentrate in the pit caused frequent replacement and resurfacing of bucket and drag teeth. To solve this problem Consolidated weldors laid 3/16-inch caps of easy-flowing MIR-O-COL No. 2 hard-facing metal over these parts. Equipment maintenance costs dropped rapidly. Today records show that these buckets are productive in 300-hour stretches before new deposits of hard-facing are required. This metal can make your equipment last longer. Write for the name of your nearest distributor.



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MIR-O-COL
HARD-FACING RODS
ALLOY COMPANY
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TO SECURE YOUR FREE COPY of the "Weldor's Guide to Successful Hard-Facing," write to MIR-O-COL ALLOY Company. Give your home address if you wish to be put on the MIR-O-COL News monthly mailing list.

FREE

...FAMOUS "LOCUST"
MARMON-HERRINGTON
AIRBORNE TANK

●

MARMON-HERRINGTON
All-Wheel-Drive
CONVERTED FORD

WORLD'S BIGGEST VALUE in *All-Wheel-Drive* TRUCKS

Goes Anywhere a Tank Can Go

● Here's the truck that is "made to order" for the toughest jobs in the road construction, road maintenance, snow removal and similar services—the truck that out-performs all others in mud, sand and snow and up steep grades. It is the truck that oil field operators, loggers, miners, and public utility crews give unending praise. Tested over the same hills, sand pits and marshes used for proving the famous Marmon-Herrington combat tanks, it goes anywhere the tanks could go—stands up to the same "punishment." These trucks are now coming off the line. Either 4-wheel-drive or 6-wheel-drive. Write for complete information.

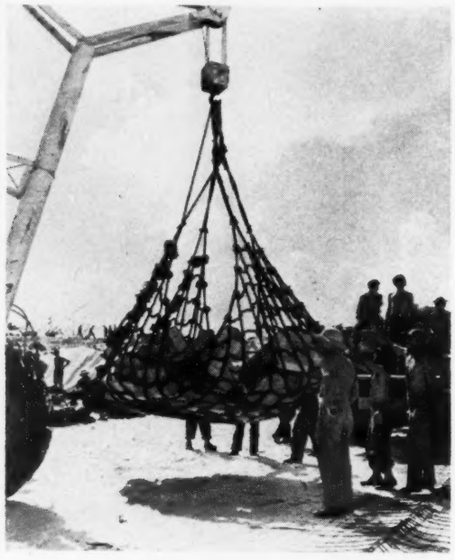
MARMON-HERRINGTON COMPANY, INC.
INDIANAPOLIS 7, INDIANA

MARMON-HERRINGTON
***All-Wheel-Drive* TRUCKS**

(Continued from page 172)

crane is excellent for this purpose. Powered by a D8 or D7 tractor, it has the decided advantage of being able to operate on a steep, sloping beach—the type most often encountered in amphibious operations. The 20-ton crane should be one of the first items put ashore.

For unloading lighter general cargo and construction materials, the ½- or ¾-yd. dragline cranes are adequate. A plentiful supply of cargo nets and slings should be provided to utilize this type of crane properly. In determining the number of nets to be provided, it should be



CARGO NETS AND TRACTOR-OPERATED 20-TON CRANE provide means for speedy handling of supplies on beach, reducing need for hand labor ashore.

remembered that probably no more than half of the number available will be actually in use at any one time. One of the disadvantages inherent in the track-laying ½- and ¾-yd. cranes is that they are prone to over-tipping on a steeply sloping beach.

Many Uses for Steel Pontoons

Steel pontoons are readily adapted to the hasty provision of temporary piers or causeways, and to use as barges. Essentially, they are rectangular steel boxes, 5x7 ft. in plan and 5 ft. deep. Designed to be strapped together to form barges or piers of any width or length desired, they also find useful application as bridge units, floating drydocks, and hulls for floating cranes. Structurally, the units will support wheel loads of the heaviest construction equipment.

Common practice is to lash strings of

(Continued on page 176)

"CLEVELANDS"

EXACTLY MEET YOUR TRENCHING REQUIREMENTS

for Oil—Gas—Gasoline—Sewer and Water Lines—Drainage
—Telephone and Telegraph Conduit—Building Foundations

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. • CLEVELAND, OHIO
CLEVELANDS Save More . . . Because They Do More

DON'T BE A WOODPECKER

WHEN YOU'RE DRIVING PILES SOCK'EM

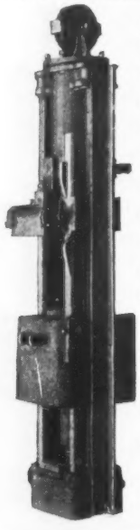
WITH

WARRINGTON - VULCAN

Single-Acting Steam

PILE HAMMERS

This rugged pile driver doesn't peck at piles —it rams 'em home with low velocity blows from a relatively heavy ram, delivering proved performance with speed and economy. It gets results through rapid, regular and continuous action, operating at a medium steam pressure. All working parts are exposed for easy accessibility. Sturdy construction and simple design give you easy operation, save you maintenance and mechanical costs. The Single-Acting Warrington-Vulcan drives any kind of pile—wood, steel or concrete, and it's been proved on the tough jobs since 1887.



We'll gladly furnish full details. Write today.

VULCAN IRON WORKS Since 1852

331 North Bell Avenue

Chicago 12 ---Illinois

(Continued from page 174)

these pontoons to the sides of LST's, drop them overboard upon reaching the unloading area, and float them into place to bridge the shallow water gap which may exist between ship and shore. The pontoon units also have varied uses as improvised truck-mounted sprinklers for constructing runway base courses, as water tanks for showers and latrines, and as fuel storage tanks.

Loading Considerations

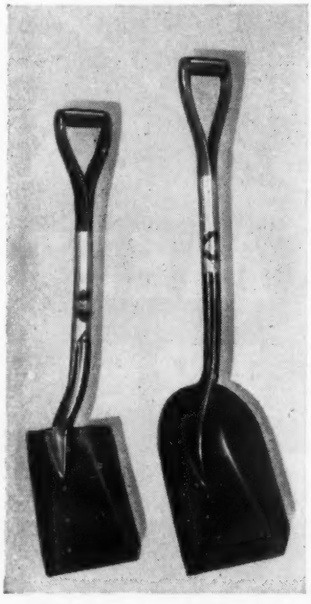
In preparation for an overseas project, too much attention cannot be paid to the details of loading. Some of the more important precautions are listed as follows:

(1) Equipment must be carefully waterproofed as a protection against salt spray and sea water. Excellent waterproofing preparations evolved during the war permit vehicles to ford as much as 4 ft. of water.

(2) Careful use of the cargo capacity of dump trucks, scrapers, and other equipment must be made to save shipping space.

(3) Equipment must be thoroughly

(Continued on page 178)



BLADE EDGES

GUARANTEED SPLIT-PROOF

INGERSOLL SHOVELS

"The Borg-Warner Line"

Write for Catalog and Prices
INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
New Castle, Indiana
Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.

9-Piece Life Saver for Construction Men

No. 610 Util-A-Tool. 10-ton capacity. Pushes apart or pulls in 4¾" each grip. Weight 74 lbs. in metal box.

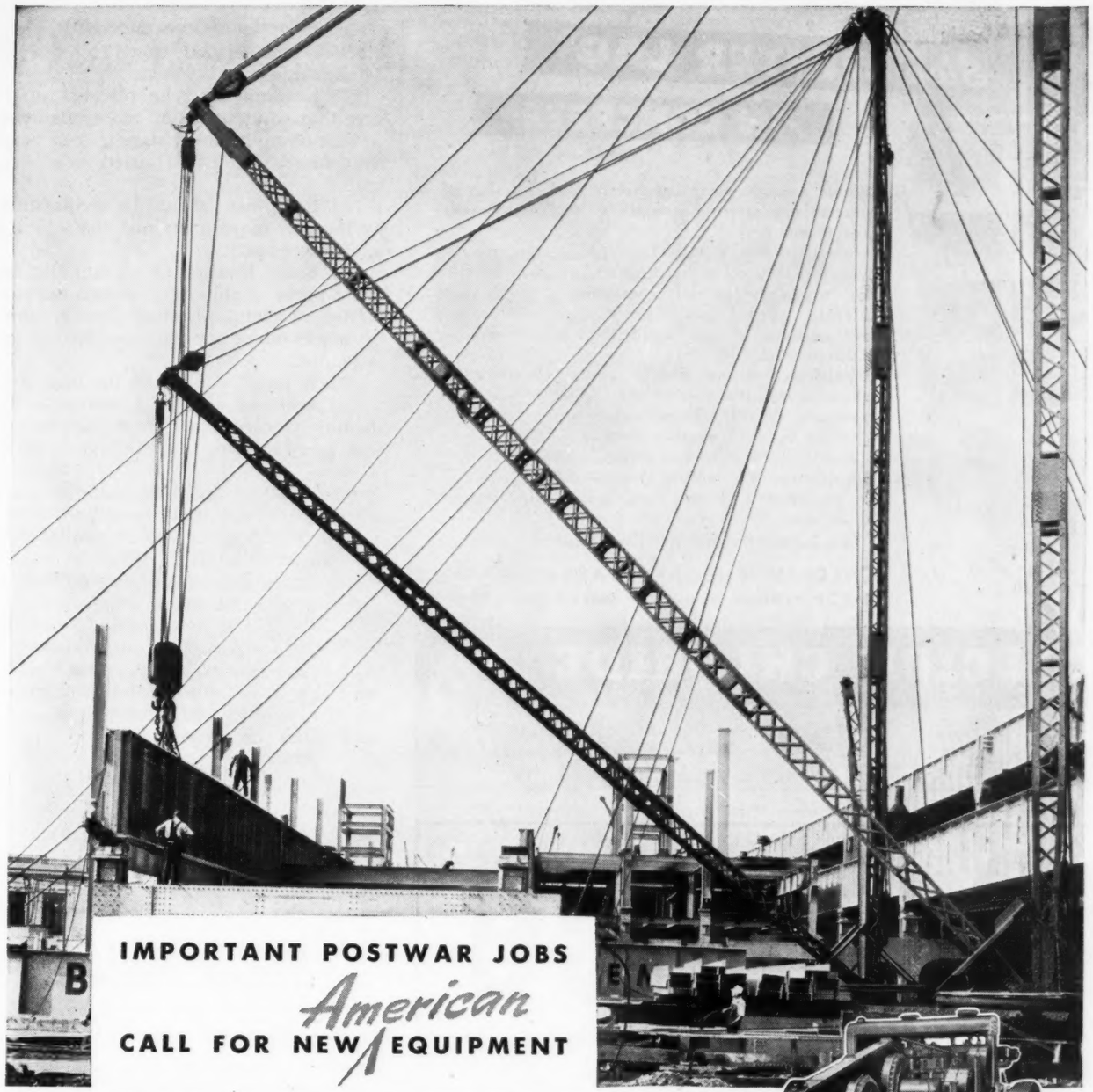
Many are the applications of the Simplex Util-A-Tool. New uses —all proving savings in time and manpower —are constantly being reported. Its 9 members are employed in many combinations to push, pull, tie forms, bind loads, clamp parts for welding, bend beams and pipe, straighten bent structural members, etc. Ask for Bulletin "P&P 43."

Templeton, Kenly & Co.
Chicago (44) Ill.

Simplex

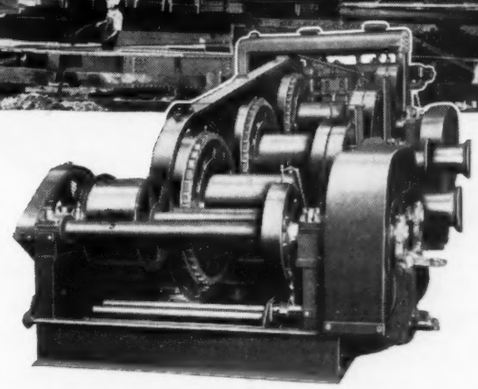
LEVER · SCREW · HYDRAULIC

Jacks

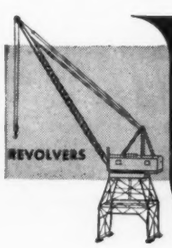


IMPORTANT POSTWAR JOBS
CALL FOR NEW *American* EQUIPMENT

Today's profitable job operations demand economy, quality work and prompt schedules. So don't gamble your profits and reputation with machinery that's old or "good enough." Base your important quotations on *new* equipment—equipment that's *built to fit the job* by American Hoist & Derrick Co. You'll move bigger loads faster. You'll minimize labor requirements, too. Workers can be more productive with "American" equipment because it is operated with modern, synchronized controls—easily, smoothly, steadily, safely. Tell us how we can help you.



"American" Model 250 hoist with three drums "waterfalled" and slewing attachment. Choice of power.



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HOIST & DERRICK CO.
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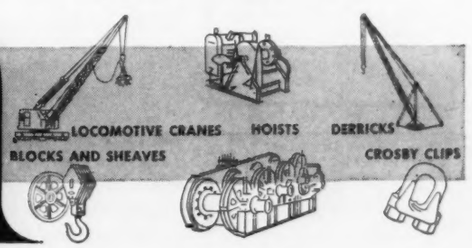

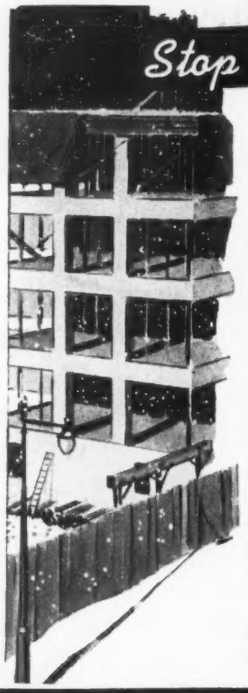

Stop WINTER LAG* IN CONCRETE

Winter Lag* is the progressively slower action of concrete in acquiring strength as the thermometer goes down.

Much of this Winter Lag* in concrete can be overcome by using calcium chloride in-the-mix. For instance, concrete containing 2% calcium chloride, exposed to 40° temperature, will acquire safe strength in practically the same time that plain concrete does at 70°. Used with other normal protection, concrete can be placed on favorable schedules all the year 'round. This is the least expensive as well as the most effective means of speeding up cold weather concrete schedules.

Besides the high early strength induced by calcium chloride you get built-in curing—automatic curing at no extra cost and you get higher strength *at all ages.*

Ask for our Bulletin 28, "Early Strength Concrete."

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CALCIUM CHLORIDE

SPEEDS WINTER CONCRETE CONSTRUCTION

Reliance

NOW Ready To Serve You

Reliance Products

Rock Crushers, Bucket Elevators, Revolving Screens, Storage Bins, Pulverizers, Chip Spreaders, Heating Kettles, Bin Gates, Feeders, Belt Conveyors, Grizzlies, Air Separators, Sand and Gravel Spreaders, Wash Boxes.

NOW—you may profit by our vast experience providing the Armed Forces with rugged equipment for Crushing, Screening and Conveying concrete aggregates, and other machinery for ROAD BUILDING.

Reliance Equipment available for prompt delivery. *Write us your requirements today.*

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y., U. S. A.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

(Continued from page 176)

blocked and lashed down to prevent damage due to heavy seas.

(4) Loading must be planned to insure that equipment and materials needed first upon disembarking, will be readily accessible and not buried in a lower hold.

(5) Equipment should be accompanied by its own spare parts and tools, and in adequate quantity.

(6) Exact location of all supplies and spare parts on ship must be carefully recorded. Careful physical checks should be made when supplies are loaded and unloaded.

(7) A small supply of lumber, steel, nails, wire and screening should be immediately accessible upon landing to provide early messing and sanitary facilities.

It is believed that both equipment and techniques used and developed in the Central Pacific Area will be available for civilian construction. Whether or not this use presupposes contracts on the part of civilian engineering firms, with one or more of the Services in connection with the construction of permanent overseas bases, cannot be determined at this time, but it is believed that rent or sale of such surplus equipment for all types of civilian use, is not unlikely.

★ ★ ★

Giant Rollers

(Continued from page 111)

increased the gross weight to 77,000 lb.

The first tests with this roller indicated that 48 tamping feet were insufficient to accomplish satisfactory compaction, so additional feet were added to bring the total number of feet to 84. Later the number was increased to 156 feet. The trips necessary to produce the required compaction were thus reduced to a reasonable number and the roller, due to progressive compaction, eventually "climbs out" until the feet penetrate to a depth of about 6 in.

Compaction of the upper 6-in. layer is accomplished by use of standard sheepsfoot rollers and a heavy rubber-tired roller for the top surface. The latter consists of steel boxes bolted together with an axle protruding from the side of each box. A dual wheel is mounted on each axle carrying two 24x32-in. 36-ply pneumatic tires. The boxes are equipped with

(Continued on page 180)

Don't Miss the Dollar for the Nickel

. . . a good rule to follow when selecting explosives

Shoveling, loading, hauling, crushing—these are big items in your over-all expense. When you try to save money by economizing on blasting, you make it more difficult for these operations to *pay*.

Remember, good blasting insures good breakage. Good breakage, in turn, means full shovel loads, with less wear and tear on expensive equipment. The only explosive that is really costly is the one that gives poor blasting results.

This does not necessarily mean the use of more explosives. It is the right handling of the whole blasting procedure that counts.

Of the 120 Atlas explosives, your Atlas Representative will help you select the *right* explosive in the *right* amount so that you achieve economy where it really counts. It *pays* to make use of his experience!

Good Blasting Makes Money
Poor Blasting Loses Money

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

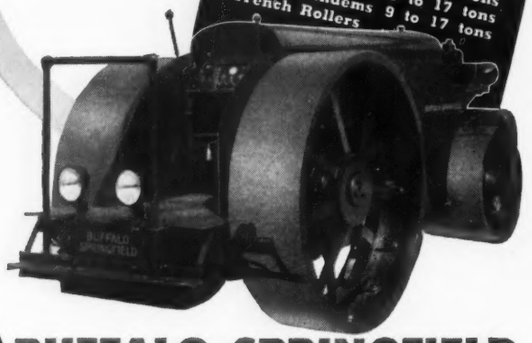
for 1946! — first again!

Two 1946 Three-Wheel Rollers AVAILABLE NOW!
Model VM-31 10-ton
Model VM-32 12-ton

• These new, better Buffalo-Springfield Rollers lead the coming procession of other efficient 1946 Buffalo-Springfield models.

Write or call your Buffalo-Springfield dealer today.

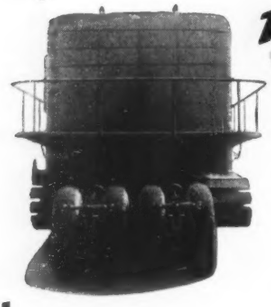
Watch for announcement of the 1946
3-Wheel Rollers 6 to 8 tons
Tandem Rollers 3 to 17 tons
3-Axle Tandems 9 to 17 tons
Trench Rollers



BUFFALO-SPRINGFIELD
The Buffalo-Springfield Roller Co.
Springfield, Ohio

The Oldest and Largest Builder of Roald Rolling Equipment in America

A Thoroughly Proven Type of ROGERS HEAVY DUTY TRAILERS gains wider acceptance



MANY riggers and contractors are solving low headroom problems with this distinctive Rogers Girder Type Trailer.

Road clearance is reduced to a minimum — loading and unloading are simplified — and loads move under bridges and low obstructions that would otherwise necessitate long detours and costly delays.

ROGERS BROTHERS CORP. ALBION, PENNA.

EXPERIENCE builds 'em PERFORMANCE sells 'em

(Continued from page 178)

a common "A" frame which serves as a drawbar with a universal hitch to which a tractor can be attached. The steel boxes are filled with scrap steel billets to obtain additional weight. On occasion, the roller has been ballasted with railroad rails so that the maximum gross load was as high as 170,000 lb.

The pneumatic-tired roller is also used as a test rig to obtain data on the performance of runway pavements under load. The two boxes mentioned above are then separated by a third box which sets in between the others like the crossbar of the letter H. This increases the wheel spacing to a distance comparable to that of the largest bombing planes.

150-Ton Unit

Carrying the development of huge rollers one step further, the U. S. Engineers at Merced Army Airfield in central California used a 150-ton giant on four 36x40 tires to test pavement sub-base after normal compaction. Hauled by a 95-hp. tractor the mammoth rig makes eight trips over the compacted sub-base, with the tires overlapping 50 percent on each trip. If no weak spots develop, the sub-base is considered satisfactory. Tires normally carry 40-lb. air pressure, but they can be filled with 4 tons of water each when additional load is desired. R. G. LeTourneau, Inc., built the huge roller for the Army Engineers.

★ ★ ★

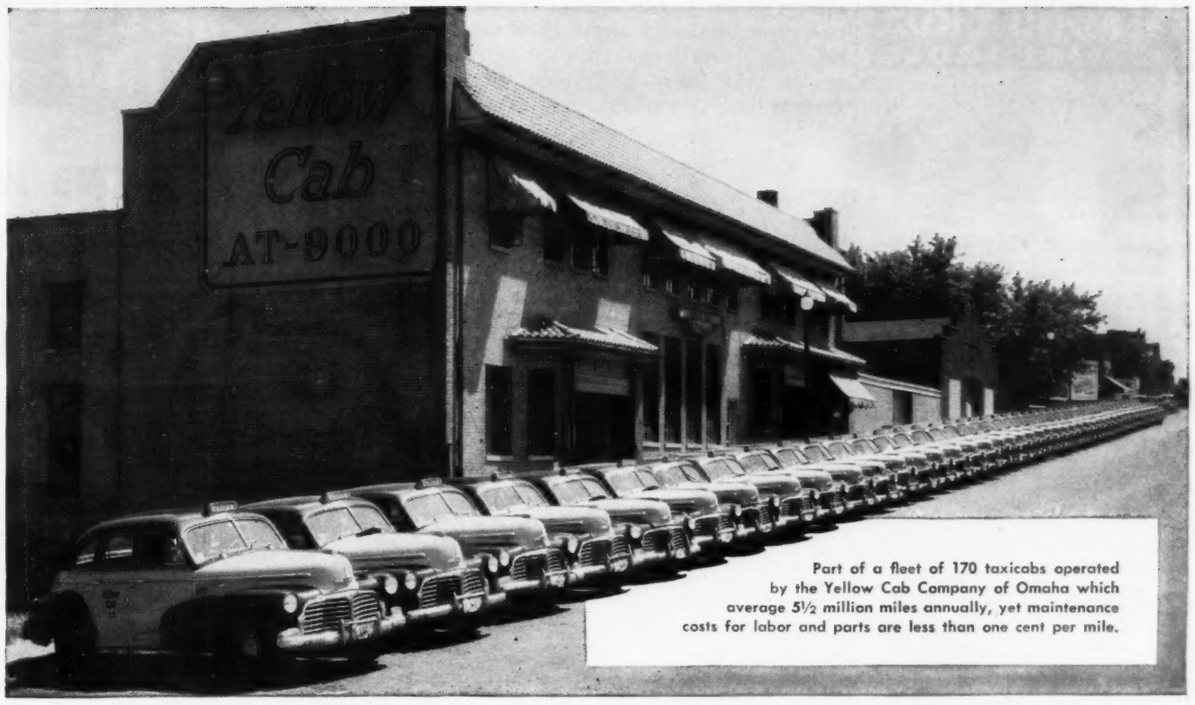
New Semitrailer

(Continued from page 79)

by 18⅝-in.) and a hand-operated plunger-type pump on the side of the trailer. The same pump activates the 6-in.-dia. by 14 11/16-in. cylinder which returns the gooseneck to its running position.

Heavy-duty springs used in the bogie construction simulate walking beams and eliminate the need for torque rods. The flexible bogie plus the large-diameter, low-pressure tires permit operation of the vehicle over otherwise impassable terrain. The wheels are so arranged that the 14:00x20, 12-ply tires track with those of the tractor truck (a 6-ton, six-wheel-drive, four-dual-tired Army vehicle, also equipped with 14:00x20 tires), thus further reducing the tractive effort when operating on soft ground. The

(Continued from page 182)



Part of a fleet of 170 taxicabs operated by the Yellow Cab Company of Omaha which average 5½ million miles annually, yet maintenance costs for labor and parts are less than one cent per mile.

Makes record for low-cost operation

With good maintenance plus Automotive Engineering and...

heat-proofed
Stanolube HD

ONE OF THE best records in the country for low-cost operation of a taxicab fleet is held by the Yellow Cab Company of Omaha. The taxi fleet pictured above operates 5,500,000 miles a year, yet cost of labor and parts for maintenance was less than one cent per mile, or *25% less than the national average cab fleet record.*

This low-cost operation is the result of unusually complete shop facilities, good preventive maintenance, and a ready acceptance of Standard's Automotive Engineering Service and Stanolube HD.

For example, water sludge in crankcases clogged the pump screens, resulting in bearing failures. The fleet superintendent discussed the problem with a Standard Automotive Engineer. Stanolube HD, along with insulation of the crankcases, greatly reduced water sludge. Clogged screens and bearing maintenance have practically disappeared.

If your fleet shop is located in the Middle West, there's a Standard Oil Automotive Engineer near you who will be glad to help you get lower cost maintenance. He has a simplified, workable Preventive Maintenance Plan and products which give outstanding results in heavy-duty fleet service. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

Buy and hold more Victory Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ **FLEET CONSERVATION SERVICE**

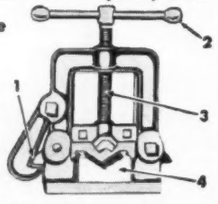
Look for the Arm and Hammer
ARMSTRONG BROS.
BETTER PIPE TOOLS

Only "ARMSTRONG BROS." Pipe Vises offer all these important features:

Solid centered jaws that prevent bending of small pipe, thin walled conduit and tubing. Oval-ended handles that will not pinch hands. Extra strength where strength is needed . . . and a fineness of design and an accuracy in machining that marks each a quality tool.

Standard Pipe Vise

1. Unbreakable drop forged steel hooks.
2. Oval handle ends, will not pinch hands.
3. Special steel screws with long-wear threads.
4. Replaceable tool steel jaws, small sizes with solid centers.

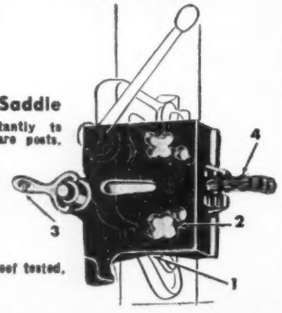


Chain Pipe Vises

1. Portable. Combines maximum capacity with minimum weight.
2. Jaws drop forged with patented solid centers.
3. Drop Forged Handle and Base, with hardened Nut and special steel Screw.
4. Proof-tested Chain.

Pipe Vise Saddle

1. Attaches instantly to round or square posts.
2. Slotted to hold standard vises of all makes.
3. Handle drop forged with hardened steel nut.
4. Link chain proof tested.



ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
334 N. FRANCISCO AVE. • CHICAGO, U. S. A.

Eastern Sales Office: 199 Lafayette St., N. Y. 12, N. Y.
Pacific Coast Office & Whse: 1275 Mission St., San Francisco 3, Calif.

(Continued from page 180)

ability of the bogie to adjust itself to uneven terrain keeps the trailer deck at a relatively horizontal position, with the result that loads with high centers of gravity may be transported with safety.

* * *

Maintaining Secondary Roads

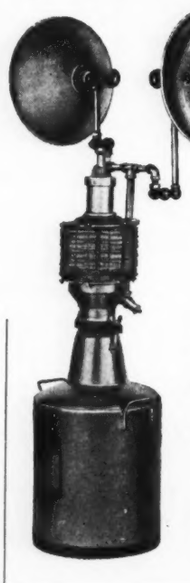
(Continued from page 107)

have been replaced with pipe, and that about 14,000 lin. ft. of pipe have been used for this purpose each year. Pipe used in replacement of some bridges ranges from 36 to 84 in. in diameter.

All maintenance equipment throughout the state is under the supervision of the equipment department, with an equipment engineer in charge. In each division there is a division mechanic and

(Continued on page 184)

National
Carbide
FLOODLIGHTS



FOR ALL PURPOSES FOR WHICH FLOOD-LIGHTS ARE REQUIRED

Simple in Construction
Economical in Cost
Dependable in Operation

Available in 1500, 8,000 and 16,000 candlepower units.

Write today for literature showing entire lines of Floodlights and Lanterns.

NATIONAL CARBIDE CORP.
60 East 42nd St.
New York 17, N. Y.

ON-THE-SPOT MIXING
with a JOHNSON
PORTO-BATCHER

Mix Where Needed . . . Saves Time, Tires and Labor

Johnson's Porto-Batcher is a complete, *portable* highway batching plant that provides fast, thorough on-the-spot mixing for many types of jobs — *wherever located.* It's compact, tows easily, erects quickly and meets all state highway requirements. *In addition to pavement work* PORTO-BATCHERS *are used as follows:*

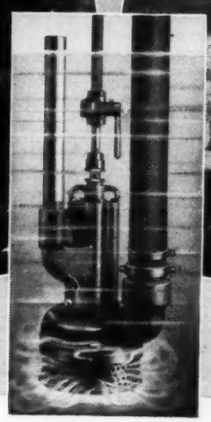
- As an auxiliary to a large ready-mix plant on large buildings, or bridge jobs, where distance from the main plant is a factor.
- By ready-mix operators who do not have a suitable site for a larger plant or who lack an established market for ready-mixed concrete in smaller communities.
- By general contractors who have a source of aggregate in construction of bridges, buildings and other concrete structures.
- By gravel producers interested in furnishing ready-mixed concrete for odd jobs or renting the machine to general contractors (along with the sale of aggregate).
- By road contractors who have occasional small street jobs or highway patching contracts.

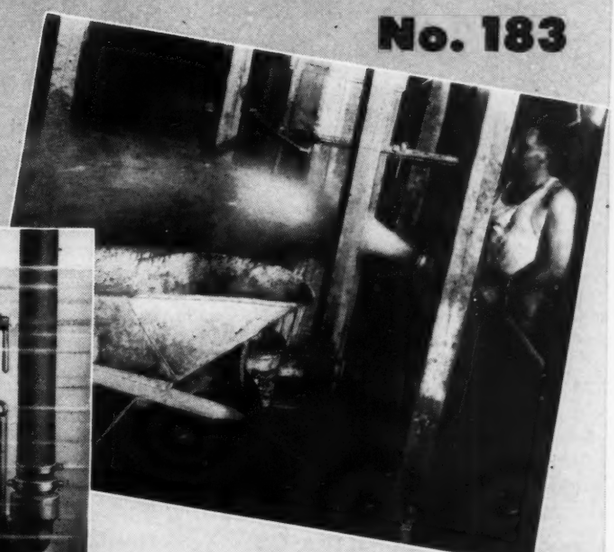
Ready Mix Plant
Bulk Cement Handling Equipment
Cement Storage Bins
Concrete Buckets
Batchers

THE C. S. JOHNSON COMPANY
Champaign, Illinois
A KOEHRING SUBSIDIARY

FAST PUMPING with the CLECO-DEMING No. 183

On this job the water dropped so fast that the operator stayed with his valve.





Water gushing from the discharge pump at over 200 gallons per minute.

THIS air operated pump has no equal for the rapid expulsion of liquids from sumps, basements, pools, ship holds, manholes, cofferdams, ditches, etc.

Weighing only 58 lbs., easily portable, the Cleco-Deming sump pump is self-priming, and operates without hesitation when wholly or partially submerged. A screen, easily removed for cleaning, prevents stones or trash from clogging the impeller. All working parts are Cammelite plated to prevent rust. Special design features insure adequate lubrication at all times. For use with oil or gasoline, a bronze body is available at slight extra cost to safeguard against sparks. Write for Bulletin 86.

While the armed services are using Cleco-Deming sump pumps extensively, our production facilities enable us to supply these pumps for commercial use also.

MEASURED CAPACITIES

With Air at 80 lbs. Gage Pressure

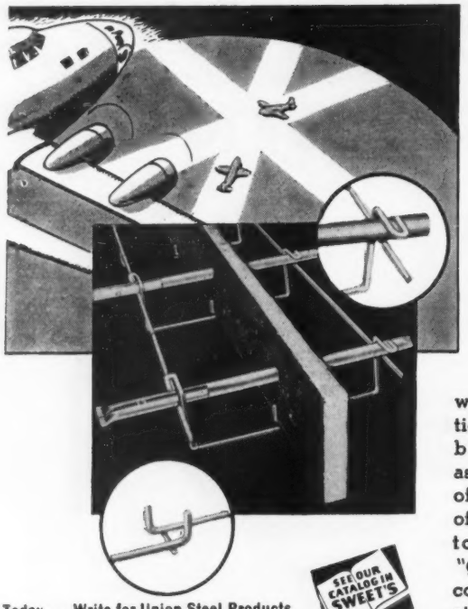
Against 10-ft. Head . . . 230 Gals. per Min.
Against 20-ft. Head . . . 218 Gals. per Min.
Against 30-ft. Head . . . 195 Gals. per Min.
Against 40-ft. Head . . . 170 Gals. per Min.
Against 50-ft. Head . . . 145 Gals. per Min.

Maximum Head, 75 Feet

Cleco air tools include: riveters, chippers, scaling tools, sand rammers, air drills, rotary grinders and air hose accessories. These tools are fully described in our large illustrated catalog which will be sent upon request.

THE CLEVELAND PNEUMATIC TOOL CO.
3781 EAST 77TH STREET • CLEVELAND 5, OHIO
Branch Offices in All Principal Cities

Build Better Runways Faster with "QUIK-LOCK"



Expansion Joint Assemblies

Because of the many advantages of *"QUIK-LOCK"* Expansion Joint Assemblies, they are widely used to speed up the construction of airplane runways and assure better jobs. Their special design assures easy positioning and locking of dowels, and accurate positioning of dowels parallel to each other and to the subgrade. Find out how *"QUIK-LOCKS"* can speed your construction and provide better joints at smaller cost.

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All six volumes have been newly revised, and tables, diagrams, formulae, reference data, have all been brought up to date, in line with recent standards and practices.

This fine library

COVERS the how and why of foundation and substructure design and construction, the general theory of structural members, the detailed design of such members and the design of their connection with other members.

EXPLAINS the principles of statics, reactions, moments and shears in beams and trusses, influence lines, methods of computing stresses in lateral trusses and portal bracing.

GIVES details of design and construction of steel, timber and concrete structures of all types.

This is a library that must be USED to be fully appreciated—that is why we want YOU to use it. We want you to forget the financial side of this proposition until you have solved some knotty problem that you may be up against—to find out how a specialist in that particular field would handle it. We want to prove to you that this Library furnishes you with what amounts to the consulting services of 54 recognized structural engineering specialists.

FOR YEARS the Hool and Kinne Library has been providing structural engineers with the facts they need *on every problem concerned with the design and construction of civil engineering structures.*

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STRUCTURAL ENGINEERS' Handbook Library

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THESE six books offer you the most complete compilation of structural engineering data ever published; they furnish you with genuinely professional information drawn from records of actual practice and written by a large staff of specialists.

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(Continued from page 182)

under him a district mechanic for each district in the highway department.

A central equipment depot, located in Raleigh, makes a large portion of major repairs to equipment. In each division there is a division equipment shop, a district shop for each district, and in most cases a sub-shop in each county.

The equipment department is run on a non-profit basis, and the rental rate for various types of equipment is based on past experience. It has been possible to purchase little new equipment during the war, but the maintenance department has been charged the same rental rate as prior to the war. As a result, $2,250,000 had accumulated in an equipment department reserve to June 30, 1945, to be used when the commission is in position to purchase replacement equipment.

Types of Equipment

Experience has shown that the most important pieces of road maintenance equipment are motor graders, road machines, four-wheel-drive trucks and 1½-ton dump trucks. Four-wheel-drive trucks are furnished to each section foreman, and are used for general utility purposes, as well as for pulling road machines. The 1½-ton trucks have been used extensively for hauling various kinds of stabilizing materials for earth-type roads, for hauling material when ditches in cuts are cleaned, and for many other necessary tasks in connection with maintenance and upkeep of roads, as well as for transportation of prisoners.

A large number of rock crushers is scattered over the state. Crushed stone on earth-type roads is a fine stabilizing material. Prisoners can be used to advantage where stationary crushers are set up in stone quarries.

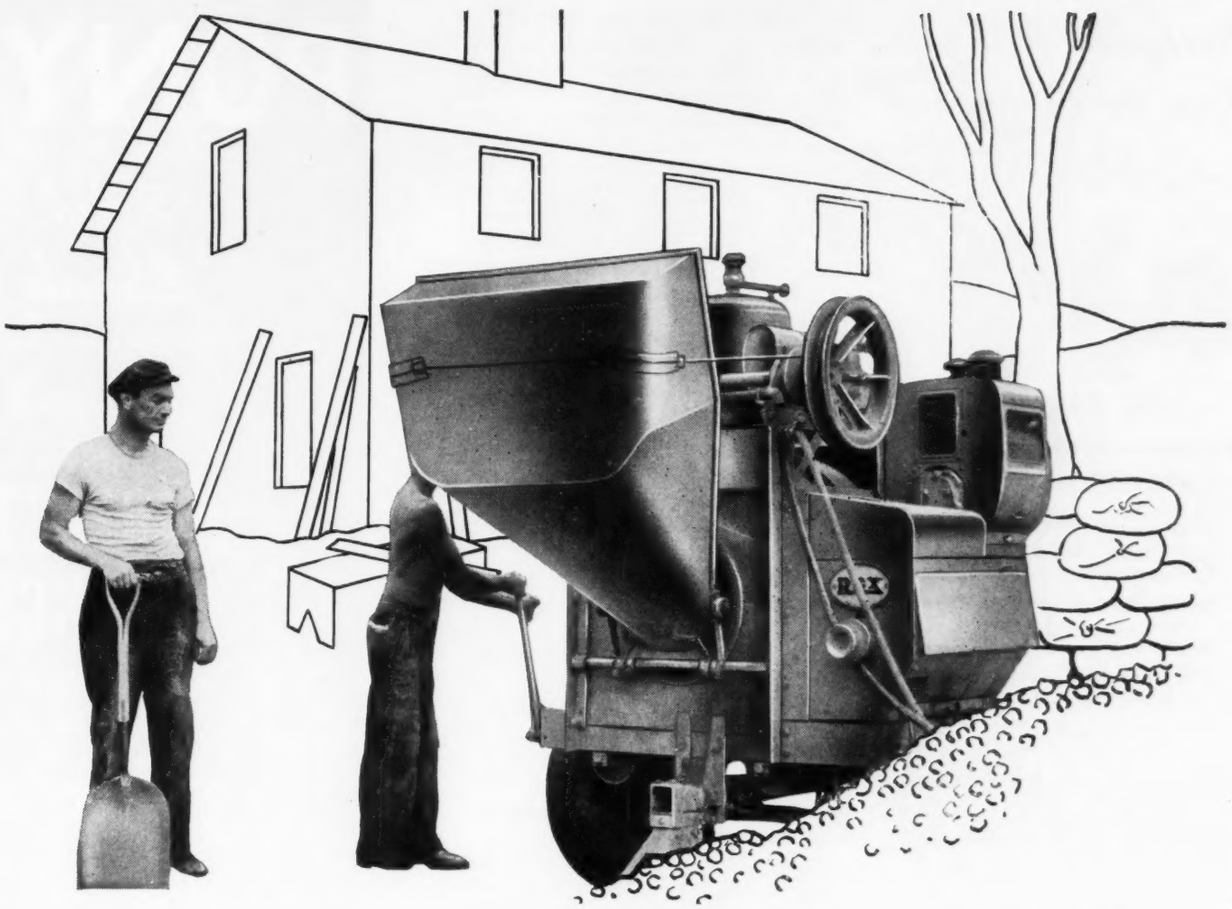
Motor graders and road machines are used extensively in machining stabilized roads or those with a predominance of clay. Road drags are used largely for keeping sandy-type roads smooth. The motor graders and road machines are also used very largely for opening side ditches, and for shaping shoulders on paved highways.

Special patch gangs under the supervision of a trained patch foreman take care of necessary repairs on bituminous roads. These specially trained foremen obtain much better results than regular section foremen and gang foremen on this type of work.

New Construction

About 90 percent of the traffic on the secondary, or farm-to-market, roads is local. To serve this traffic best, it is necessary to construct and improve roads where the people live. The com-

(Continued on page 186)



WHY SCUTTLE THE SKIP?

YOU DON'T have to pound the life out of a skip to get all the batch into the drum. There's a newer and better way . . . with a Rex Mixer!

For with Rex there is no need to pound, slam or bang the skip. It's the fastest and best skip ever made . . . the "Shimmy Skip" . . . that provides the proper, snappy shaking action that kicks the batch into the drum *fast.* This shaker action is actuated by the lugs in the drum . . . the heaviest part of the machine. What's more, vibration does not reach the power plant or transmission to shorten mixer life. The streamlined design of the skip prevents "pocketing" of the batch. It's a real "time-saver," this "Shimmy Skip" action, that saves seconds on every batch.

But that's just one of the many features you get with Rex. Water control is practically 100% accurate. The exclusive Chain Belt Drive *cushions shocks,* prolongs mixer life. Designed and controlled for heaviest duty, Rex Mixers have less weight, perfect balance for easier transporting and spotting.

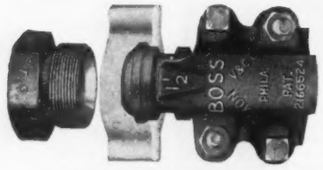
You can specify Rex and save time, labor and money. See your Rex Distributor for complete information or write direct for Bulletin No. 446. Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

REX

CONSTRUCTION MACHINERY

Designed to Keep Hose in Service...

L-O-N-G-E-R!

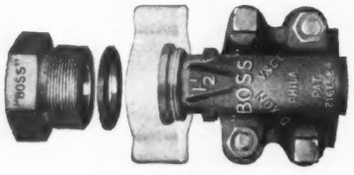


"G J-BOSS"

Ground Joint Style X-34

FEMALE HOSE COUPLING

Built to assure maximum strength and efficiency on high or low pressure steam, air and liquid hose lines. Ground joint construction provides washerless, leakproof seal. "Boss" Offset Interlocking Clamp anchors coupling to hose with strong, full-circumference grip. Corrugated stem gives added holding power. Sizes: ½" to 4", inclusive.



"BOSS"

Washer Type Style W-16

FEMALE HOSE COUPLING

Same as "G J-BOSS", above, except that seal between stem and spud is effected by high quality asbestos or oil-treated leather washer. Sizes: ¼" to 4", inclusive.

"BOSS" MALE COUPLING

STYLE MX-16

Companion to both of the couplings shown above. Strong, durable, safe. For steam, air and liquids, including oil, butane, ammonia, etc. Sizes: ¼" to 4", inclusive. Each size fits same size straight end hose.

Sold by Manufacturers and Jobbers of Mechanical Rubber Goods.

DIXON

VALVE & COUPLING CO.

Main Office and Factory: PHILADELPHIA, PA.

BRANCHES: CHICAGO BIRMINGHAM LOS ANGELES HOUSTON

(Continued from page 184)

mission has endeavored to construct new roads on reasonably safe alignments and grades, procuring as much sight distance as feasible, dependent to some extent on the amount of traffic which the road is estimated to carry. It is necessary in most cases to follow within a reasonable distance the location of the old road, eliminating the bad kinks and curves, both vertical and horizontal.

In building secondary roads, local materials are used to the greatest extent possible, just as they are in maintaining them. Traffic on most of these roads is low and includes few heavy trucks.

Cost of Secondary Roads

Returns from a road will not justify the cost of paving it, even with a light bituminous surface treatment, unless the road carries about 100 vehicles per day. Cost of constructing secondary roads varies widely in different sections of the state. The cost per mile for necessary grading, satisfactory base course, and light bituminous treatment is $10,000 to $25,000, depending upon terrain and certain other controlling features.

Funds for Construction

All construction funds in North Carolina are allocated to various divisions in accordance with the same formula used in the Federal Aid Highway Act of 1944, which seems about as fair as any formula that could be derived to suit conditions in the state.

It is expected that some projects will be constructed in every county of the state, but it is obvious that it will be impossible to distribute the funds among subdivisions as small as the counties on the same basis as provided in the Federal Aid Highway Act. Distribution will be equalized by allocations to the ten divisions of the state, based on the Federal Aid Highway Act formula.

The total amount of federal funds per year under this act provides $4,453,613 for secondary or feeder roads in North Carolina. These funds are to be matched on a fifty-fifty basis with state funds, which will mean a federal-aid construction program of at least $9,000,000 for each year of the 3-year post-war period. In addition to this, $5,000,000 of general betterment funds, a large portion of which might be termed construction, is available for each year of the biennium. There is always a possibility that, if sufficient engineering forces are available to take care of an increased portion for construction, there may be additional state funds available for such work.

North Carolina's total construction program for the 3-year post-war period

(Continued on page 188)

PONY

Solid Shank

FEATHERWEIGHT

Shovels

•

PERFECT BALANCE

A new redesigned socket gives to the PONY Solid Shank Shovel the perfect balance which no other solid shank shovel has.

Equipped with

SHOCK BAND

The famous ABW Shock Band gives to the shovel greater handle strength. This is a patented feature of PONY Solid Shank Shovels.

Ask Your Jobber

AMES Since 1774

AMES-BALDWIN WYOMING CO.

Parkersburg, W. Va. North Easton, Mass.

ABW PRODUCTS

SHOVELS FORKS
SPADES HOES
SCOOPS RAKES
POST HOLE DIGGERS
AGRICULTURAL HANDLES

This Power Clutch NEVER "Takes Over"

RETAINS "FEEL" OF THE LOAD

Unlike a booster clutch, which gives the operator no more than "on-or-off" control, the Koehring 605 Power Clutch never takes over. Simple linkage maintains constant control over the main clutch band. Complete control is maintained over the in-between stage, between full engagement and full disengagement. There is no continuous slipping booster, no complicated, sensitive network of air lines.

ONE-TENTH THE LEVER PULL

In all operations, a light lever pull sets this powerful 37-inch clutch—only 1/10 the pull required to set a manual clutch of comparative size.

AUTOMATIC HEAT ADJUSTMENT

Continuous, time-consuming adjustments for heat expansion are unnecessary on the Koehring Power Clutch. A large compensator spring automatically makes the required tension changes.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

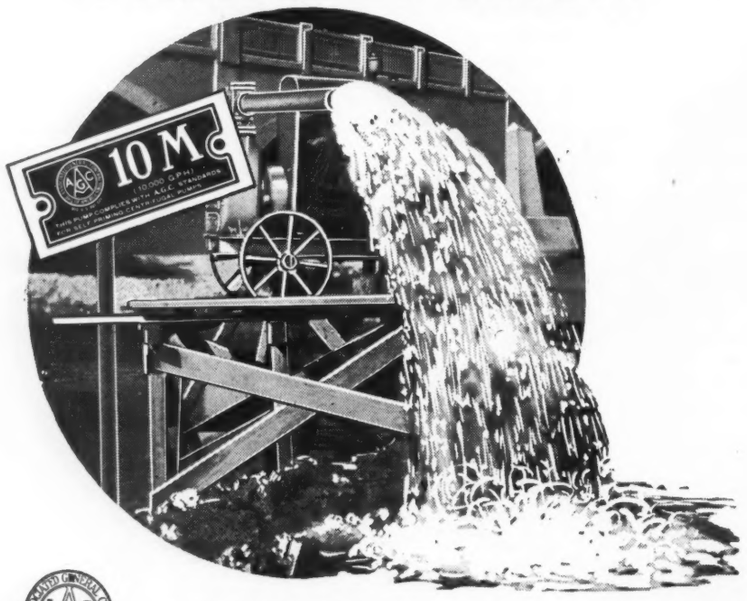
KOEHRING
605

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

THE OWEN BUCKET CO.
6020 Breakwater Avenue Cleveland, Ohio
Branches: New York, Chicago, Philadelphia, Berkeley, Cal.

SYMBOL OF SAFETY



Be safe in buying a pump by choosing one with the AGC rating plate. It is your assurance of better pumping—a guarantee that the pump will deliver full rated capacity.

CONTRACTORS PUMP BUREAU

BARNES MANUFACTURING CO. Mansfield, Ohio
CHAIN BELT COMPANY Milwaukee, Wis.
JAEGER MACHINE CO. Columbus, Ohio
C. H. & E. MANUFACTURING CO. Milwaukee, Wis.
CONSTRUCTION MACHINERY CO. Waterloo, Iowa
MARLOW PUMPS Ridgewood, N. J.
Affiliated with
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.
STERLING MACHINERY CORP. Kansas City, Mo.
CARVER PUMP CO. Muscatine, Iowa
THE GORMAN-RUPP CO. Mansfield, Ohio
NOVO ENGINE CO. Lansing, Mich.

(Continued from page 186)

will range betwen $75,000,000 and $100,000,000. The greatest bottle-neck in carrying out such a program will be in obtaining necessary engineering personnel to take care of location, design and construction of the projects.

★ ★ ★

Suspended Scaffold

(Continued from page 112)

suspended scaffold and on intermediate working levels along the two side walls, as indicated by one of the photographs.

In erecting the suspended scaffold, it was essential to the safety of the operation that men working below the ceiling have some means of obtaining information from workmen above the ceiling. Before proceeding to climb from one hanger to the next, the men below the ceiling had to be sure that the cables were securely fastened to the steel framing of the roof. The problem of transmitting accurate information between the two crews was met by use of an inter-office communicating system which permitted the two foremen to check quietly with each other. Erection of the scaffold was completed without an accident.

Materials for the scaffold were taken up by freight elevators to the roofs outside the windows and were passed through the windows by hand. Workmen on the intermediate levels of the two side scaffolds raised the tubular framing and planking for the main suspended scaffold.

Ceiling Renovation

Time had dimmed the famed gold-leaf constellations and signs of the Zodiac on the cerulean blue ceiling of the concourse in the 32 years since it first was painted. Workmen supported by the hanging scaffold first covered the original decoration with sheets of ⅛-in. pressed asbestos Flexboard, glued and wired to the ceiling proper with preformed steel ties. Over this new surface, painters working under the direction of Charles Gulbrandsen have reproduced the original decorations, using some 500 gal. of paint and the necessary gold leaf. Patrick F. Solan is resident engineer in charge for the New York Central R. R.

FOR TODAY'S ROAD BUILDING

Buy the Bethlehem Way

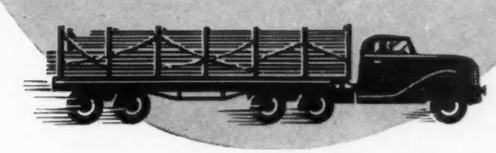
It pays to get your bar mats, reinforcing bars, road joints, highway guards and posts, steel sheet piling, steel H-piling, and other road-steel from one reliable source of supply—Bethlehem.

Think of all the time usually wasted in paper work, that you'll save by obtaining your needs on a single order, with items scheduled to arrive when and as you need them. This way you'll get faster, generally more efficient response to your orders. No worries about idle men or idle equipment!

Get in touch with the nearest Bethlehem district office for details about Bethlehem's road steel service, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

The Bethlehem Way:

Ordering all road-steel needs from Bethlehem, which cuts trouble to a minimum, often lowers freight costs, and insures prompt delivery.



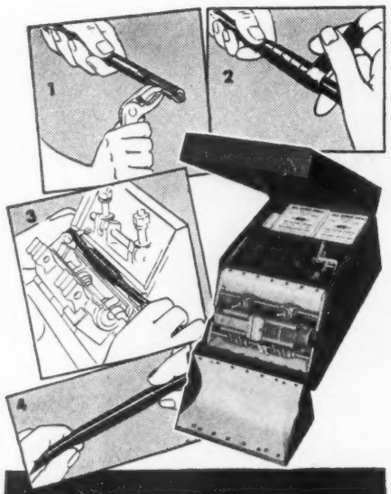
The Hard Way:

A different source for every road-steel item, which means duplication of letter-writing, telephoning, bookkeeping — time and energy wasted.

★ ★ BETHLEHEM STEEL ★ ★

BETHLEHEM PRODUCTS FOR HIGHWAYS

Road Joints • Center Strip • Dowels • Dowel Bar Supports • Reinforcing Bars • Bar Mats • Bar Ties • Reinforcing for Concrete Pipe • Bridge Floor Reinforcing • Concrete Slab Spacers • Welded Wire Fabric • Guard Rails • Guard Posts and Brackets • Wire Rope and Strand • Right-of-Way Fence and Posts • Anchor Rods • Pipe • Hollow Drill Steel • Digging Bars Structural Steel • Mold Boards • Corrugated Sheets • Turnbuckles • Tie Rods, Spikes, Bolts and Nuts • Timber Bridge Hardware Sheet and H-Bearing Piling



Eliminate Dangerous Make-Shift Cable Repairs With

MINES CABLE VULCANIZER KIT!

Make-shift repairs in rubber-covered portable electric cable are a constant cause of trouble, expense, and danger, often causing a portion of the cable to be sent to the scrap pile. Such a dangerous repair can be eliminated through the use of the Mines Portable Cable Vulcanizer Kit.

Safe cable repair made with Mines Kit

Typical ordinary taped splice after a short period of use

Thousands of Mines Kits have been in use by all branches of the Armed Forces where trouble-free cable repairs were a necessity and had to be made quickly. A repair made with the Mines Kit is flexible, little more in diameter than the cable itself, and many be wound on a reel.

The Portable Kit contains all necessary supplies and tools. Molds are available for various cable types. Sizes up to 1⅜ inch diameter may be accommodated in the VDIR-213.

Write for bulletin RV-104K.

MINES EQUIPMENT COMPANY

4245 Clayton Avenue
St. Louis 10, Missouri

New Concrete Blanket

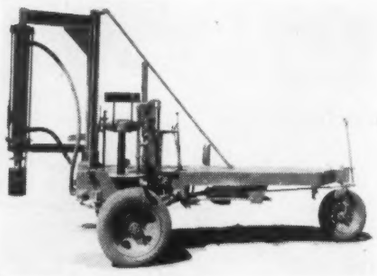
(Continued from page 102)

and the sand are weighed, the 1 yd. of aggregate is dropped on to a belt conveyor below, which transfers it to the mixer-truck. At this same hopper, Duraplastic air-entraining cement is added.

Two trailer vans were used for storing cement which arrived in Shelburne Falls by freight about 5 p.m. and was transferred to the vans during the evening by a local trucking concern. The gravel was trucked from a washed gravel plant in Deerfield, Mass., a distance of about 16 mi. This plant not being in operation and having no sand in stock, the sand was trucked from a washed gravel plant in Northfield, Mass., a distance of about 23 mi.

The first concrete was poured Aug. 9 and the last was poured Sept. 1. The photograph at the top of page 100 was taken at the dam Aug. 23 while pouring the ninth section from the right hand

(Continued on page 192)



Junior RAPID PAVEMENT CONCRETE BREAKER

Fastest Pneumatic Method
Cuts Cost and Time
Works Inside or Out
Good for all Small Jobs

Ask about our

HEAVY-DUTY TYPE

RAPID PAVEMENT BREAKER COMPANY

1517 Santa Fe Ave. Los Angeles 21, Calif.

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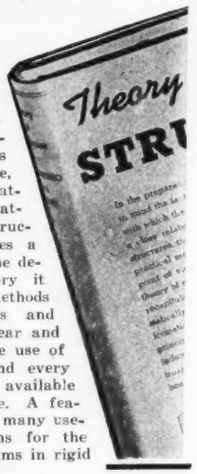
to save you time, ensure your work of perfect structural qualities



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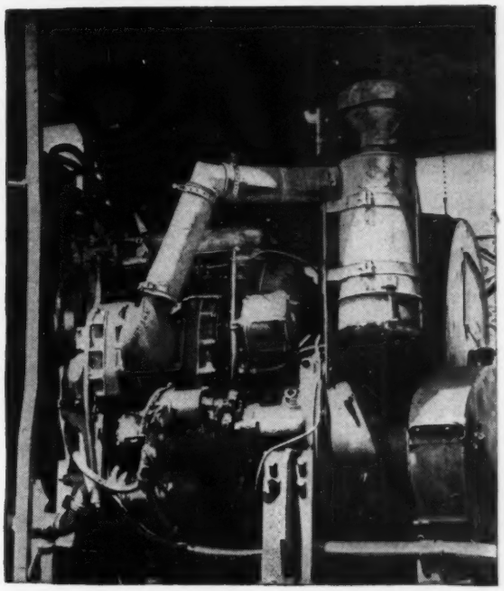

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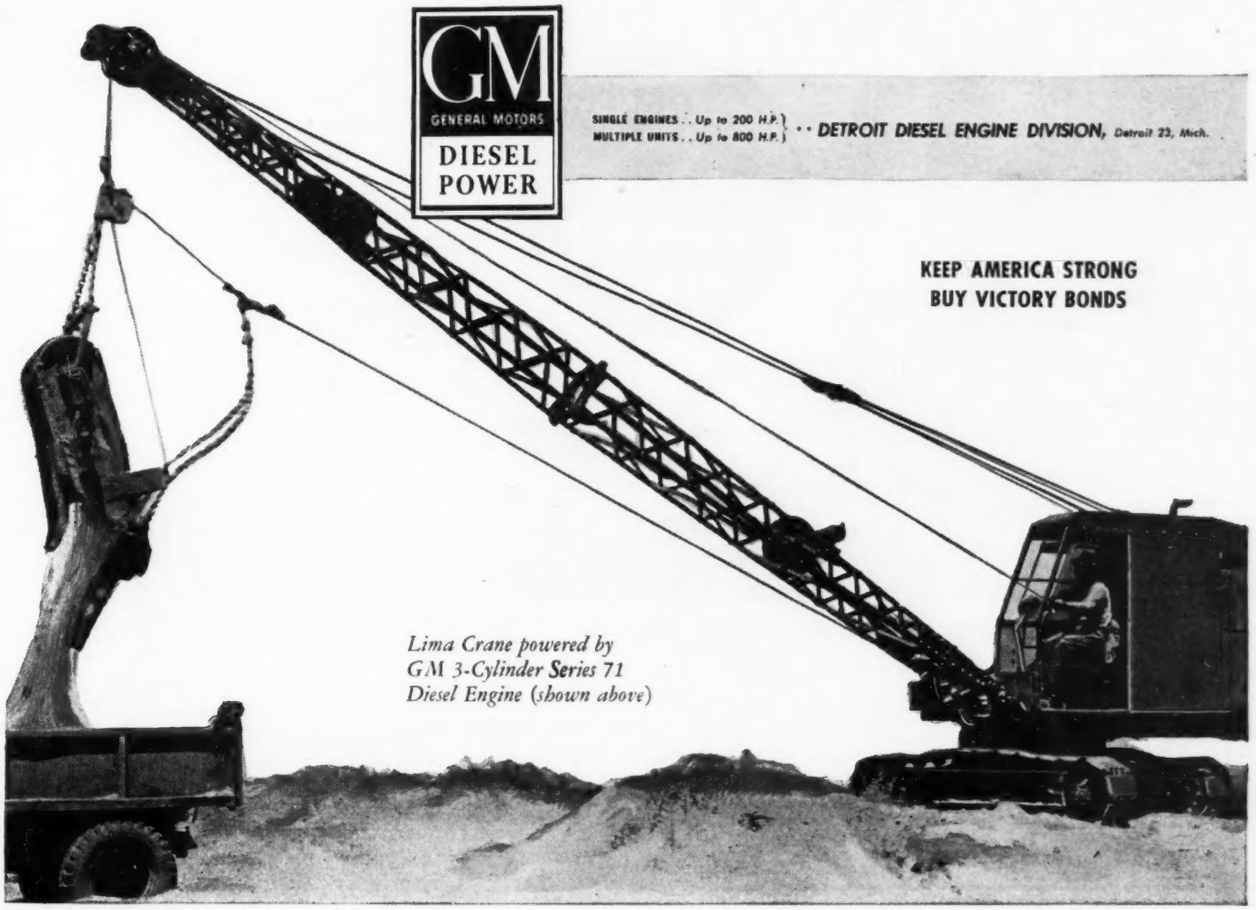

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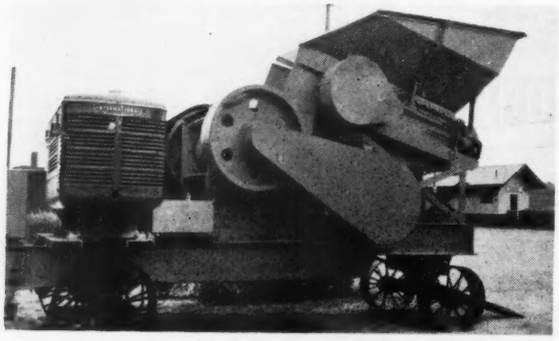

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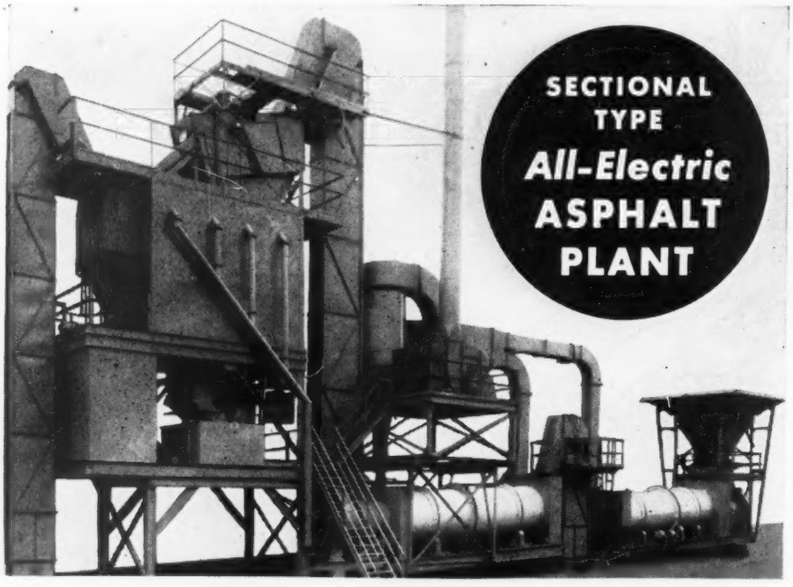

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(Continued from page 190)

abutment. The sixth section is shown with forms ready for concrete which was poured Aug. 25. Men in the foreground are just starting to set forms for the eleventh section.

The ribs of the forms are on about 19-in. centers. The stringers above the ribs are spaced directly over the dowels in the old dam and are tied to the dowels with Richmond Tiscrus. Inverted 30-lb. industrial rail, welded to the flashboard sockets, supports the upper ends of the ribs. The rail is concreted into the crest to provide a seat for flashboards. Plywood panels 5/8 in. thick, 2 ft. wide and 8 ft. long are fastened to the under side of the ribs as the concrete is being placed.

As soon as the forms were removed from each completed section, the concrete surface was sprayed with an application of Ritecure.

Material Analyses

The concrete mixture used for this work was as follows:

Duraplastic cement 6.1 bags	574 lb. per cu. yd.
Sand	1,160 lb. per cu. yd.
Gravel	1,985 lb. per cu. yd.
Total water 31 gal.	258 lb. per cu. yd.
Total weight....	3,977 lb. per cu. yd.

Mixing 10 percent of gravel from the 1½-in. stock pile in Deerfield with 90 percent from the 1-in. stock pile resulted in the following sieve analysis for the gravel.

Square Mesh Screen	*Accumulative Percent Passing*
1½ in.	98.4
1 in.	73.2
¾ in.	49.2
½ in.	22.3
⅜ in.	14.0
4 M.	2.2

The sieve analysis for the sand was as follows:

Square Mesh Screen	*Accumulative Percent Passing*
4 M.	98.4
8 M.	85.8
16 M.	53.6
30 M.	25.4
50 M.	9.1
100 M.	2.8
200 M.	0.6

The 28-day test shows this concrete to have a crushing strength of at least 3,700 lb. per sq. in.

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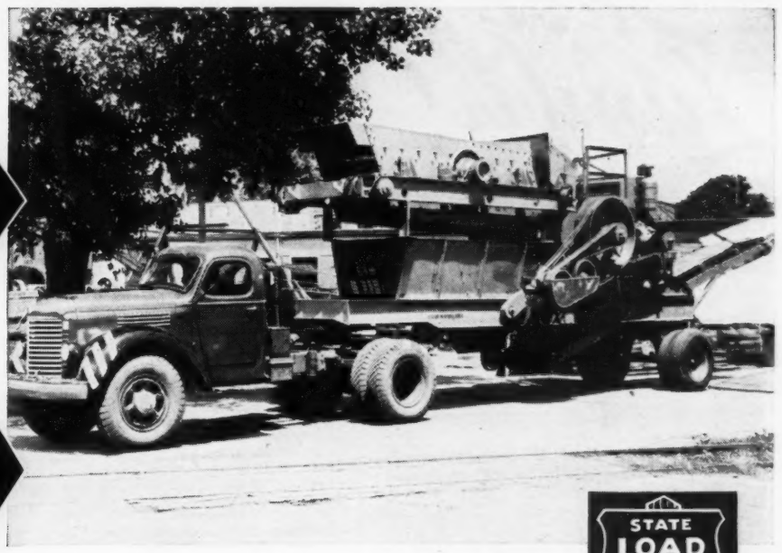

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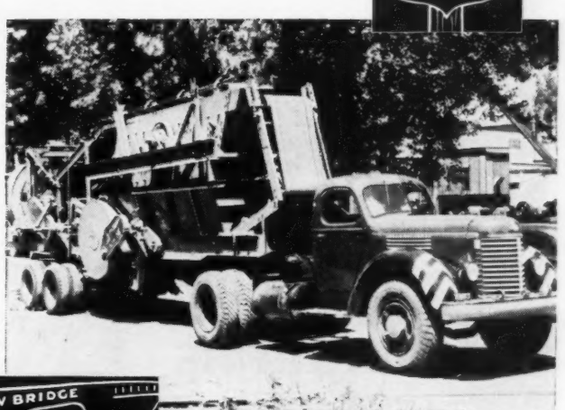

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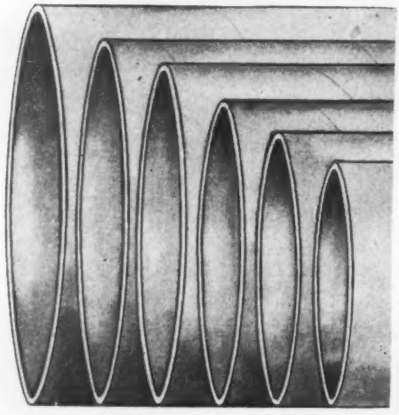

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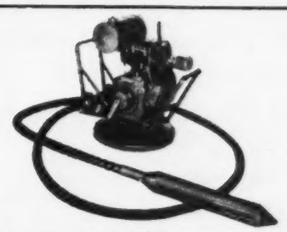

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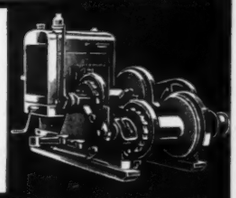

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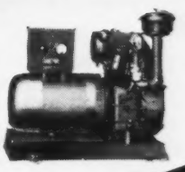

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Of Construction Methods, published Monthly at New York, N. Y., for October 1, 1945.

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Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management of Construction Methods, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the name and address of the publisher, editor, and business manager is: Publisher, McGraw-Hill Publishing Company, Inc., Editor, R. K. Tomlin; Managing Editor, None; Business Manager, A. E. Paxton; all of 330 West 42nd Street, New York 18, N. Y.

2. That the owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City. Stockholders holding 1% or more of stock: James H. McGraw; James H. McGraw, Jr.; James H. McGraw, Jr., Curtis W. McGraw and Edwin S. Wilsey, Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, all of 330 West 42nd Street, New York City; Edwin S. Wilsey and Curtis W. McGraw, Trustees for James H. McGraw, 3rd, Madison, New Jersey; Curtis W. McGraw, 330 West 42nd Street, New York City; Donald C. McGraw, 330 West 42nd Street, New York City; Mildred W. McGraw, Madison, New Jersey; Wilson C. Laucks, Spruce and Canal Sts., Reading, Pa.; Grace W. Mehren, 73 No. Country Club Dr., Phoenix, Ariz.; Margaret Stump, 1418 Rose Virginia Rd., Wyomissing Park, Reading, Pa.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

J. A. GERARDI, Secretary
McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 20th day of September, 1945.
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(My commission expires March 30, 1946.)

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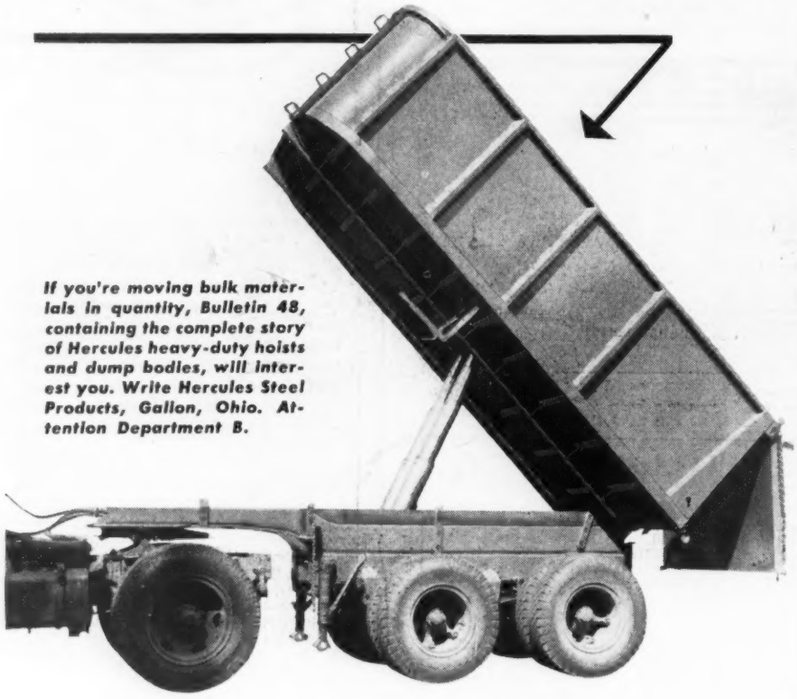

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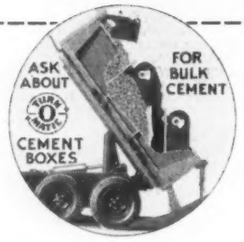

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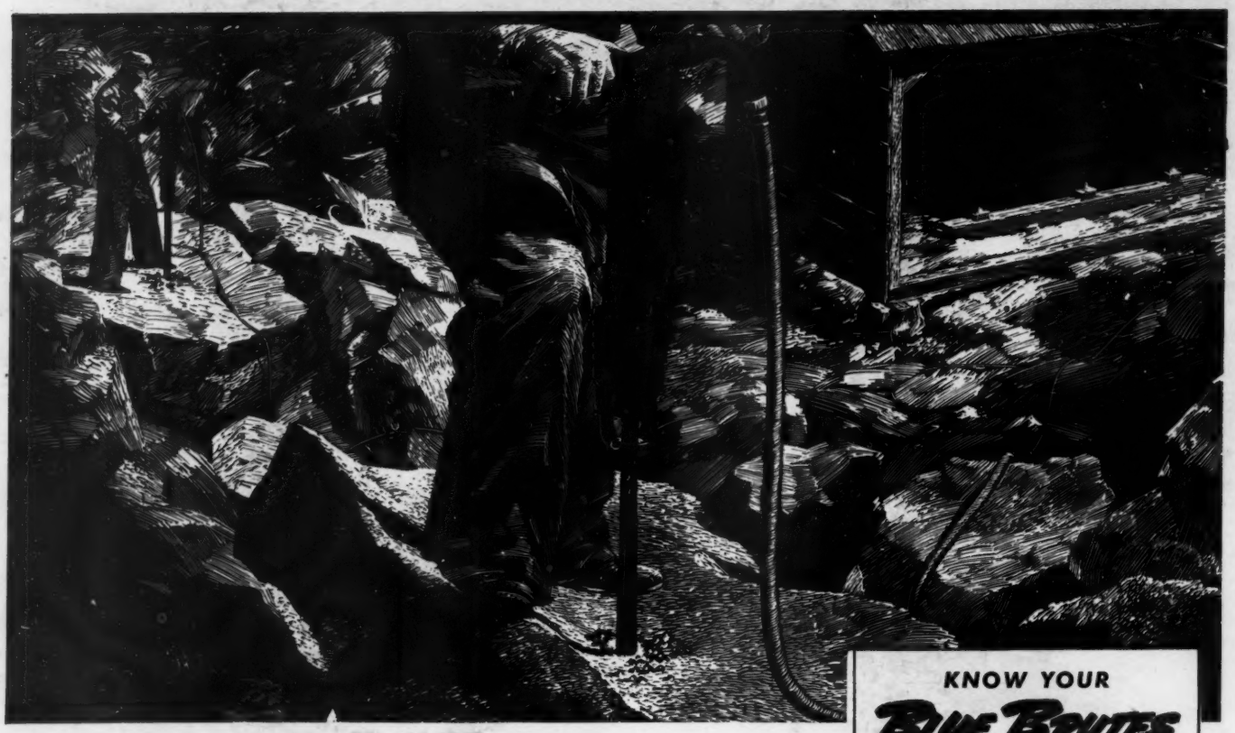

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